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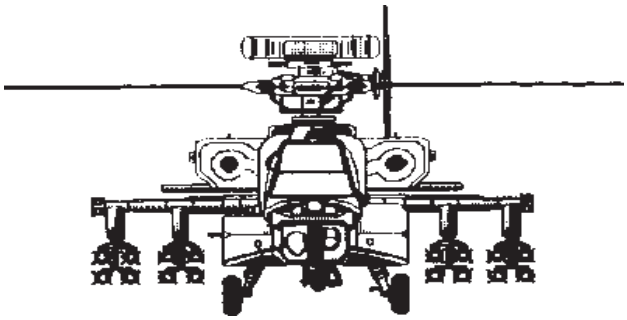
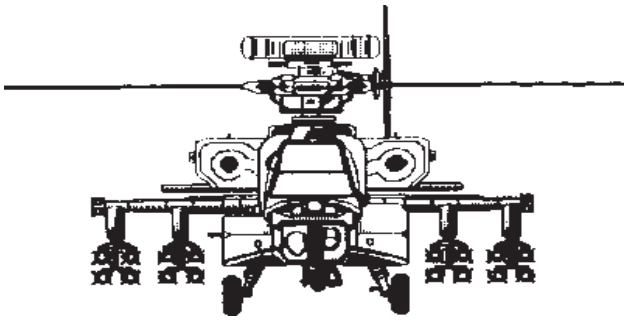
SECOND EDITION

MTMCTEA REF 98-55-21





Lifting and Tiedown of U.S. Military

Helicopters

for Marine Transport

MTMCTEA **REF NO. 98-55-21**

TRANSPORTATION AND TRAVEL

LIFTING AND TIEDOWN OF U.S. MILITARY HELICOPTERS FOR MARINE TRANSPORT

SECOND EDITION (online version updated)
JANUARY 2001

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MILITARY TRAFFIC MANAGEMENT COMMAND
TRANSPORTATION ENGINEERING AGENCY
720 THIMBLE SHOALS BLVD, SUITE 130
NEWPORT NEWS, VA 23606-2574

This is the second edition of this handbook. It supersedes the first edition, *Lifting and Tiedown of U. S. Military Helicopters* (January 1995). However, copies of the first edition still have value, and you may continue to use any copies you have. For this edition, we have retained all the information from the first edition except the information on the TH-57B/C Sea Ranger helicopter. This information was deleted because the TH-57B/C is a training helicopter and is not deployed. This editon also includes information on theAH-64D Longbow Apache.

This book is part of the series started with MTMCTEA PAM 55-19, *Tiedown Handbook for Rail Movements*. The books in this series are:

MTMCTEA PAM 55-19, *Tiedown Handbook for Rail Movements*
MTMCTEA REF 96-55-20, *Tiedown Handbook for Truck Movements*
MTMCTEA REF 98-55-21, *Lifting and Tiedown of U.S. Military Helicopters for Marine Transport*
MTMCTEA Ref 97-55-22, *Marine Lifting and Lashing Handbook*
MTMCTEA Ref 95-55-23, *Containerization of Military Vehicles*
MTMCTEA Ref 98-55-24, *Vehicle Preparation for Airlift* (future)

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NOTE

This pamphlet is unofficial and provides only a hip pocket reference and familiarization in the transportability of U.S. military helicopters. Although it has been staffed extensively throughout the aviation community, some modifications and helicopter design variations may not appear in this reference. Official procedures for the preparation, disassembly/reassembly, lifting, and tiedown are outlined in the Preparation for Shipment manuals listed in the Bibliography of this pamphlet. Technical assistance for the preparation, disassembly/reassembly, lifting, and tiedown of U.S. military helicopters may be obtained from Headquarters, U.S. Army Aviation and Missile Command (AMCOM), ATTN: AMSAM-MMC-LS-DP, 5302 Sparkman Center,Redstone Arsenal, AL 35809, DSN 746-2526 or (205) 876-2526.

Preface

The purpose of this pamphlet is to aid the shipping unit and provide general guidelines for helicopter transport.

This pamphlet contains general information concerning lifting and tiedown procedures on US military helicopters. Helicopters are extremely fragile, high-dollar materiel; extreme care must be taken to ensure proper and safe transport.

This pamphlet provides general guidance only. All preparation, lifting, and tiedown will be in accordance with the preparation for shipment manual for the helicopter being shipped. All ground handling of helicopters will be supervised by trained aviation personnel. All rigging of helicopters for lifting will be directed by aviation personnel, trained and on unit orders to supervise rigging operations. Helicopter models vary; therefore, it is the responsibility of the deploying unit to provide the appropriate technical manuals and to prepare and secure the proper equipment for transport of its aircraft.

We invite the users of this pamphlet to recommend changes and submit comments. Please prepare comments on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forward to:

Military Traffic Management Command
Transportation Engineering Agency
ATTN: MTTE-DPE
720 Thimble Shoals Blvd, Suite 130
Newport News, VA 23606-2574

Address email messages to: NAPIECEJ@BAILEYS-EMH5.ARMY.MIL. Telephone inquiries may be made by calling DSN 927-4646, commercial (757) 878-4646, or 1-800-722-0727. Make requests for additional copies to this same address.

After action/lessons learned information is requested from units involved in shipping helicopters. Send the above information and requests for technical assistance to the technical point of contact at:

HQ US Army Aviation and Missile Command
ATTN: AMSAM-MMC-LS-DP
5302 Sparkman Center
Redstone Arsenal, AL 35809

LIFTING AND TIEDOWN OF U.S. MILITARY HELICOPTERS

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Section I. GENERAL GUIDELINES

A. This pamphlet provides users with general guidance for the preparation for shipment, lifting, and tiedown of U.S. military helicopters during transport by sea. It contains basic information from a variety of sources and from experience gained from loadouts and live deployments.

B. Helicopters loaded into a vessel must be secured with chains to counteract longitudinal, lateral, and vertical forces. It is essential that chains be tightened only enough to remove slack; over tightening of chains will result in structural damage to the helicopter. Bridging (blocking and bracing) of helicopters is not authorized. All aircraft preparation, lifting, and tiedown will be in accordance with the appropriate preparation for shipment manual. Preparation for shipment manuals are listed in the Bibliography at the back of this pamphlet.

C. Because of the complexity of helicopter preparation and loading procedures, predeployment planning is essential. Transport mode assignment should be identified and communicated, by the deploying unit, to the staging area terminal (Port Support Activity(PSA)) as early as possible to allow adequate planning. The shipping configuration should minimize disassembly. This helps reduce assembly and test flight requirements upon arrival at the port of debarkation (POD).

D. The staging area terminal (port of embarkation (POE)) commander should ensure that coordination for terminal support (equipment, personnel, and materials) has been completed by the deploying unit and the staging area terminal.

E. The following "guidelines" apply to all types of helicopters.

1. Personnel

Shipment of a helicopter requires at least two aircraft maintenance personnel, qualified in the lifting and tiedown of military helicopters.

2. Handling

Helicopter ground handling must be accomplished only by qualified aviation personnel, preferably from the deploying unit.

3. Packaging

All rotating helicopter parts such as main and tail rotors must be positively secured to prevent them from moving while loading or during shipment. All removed components will be preserved and packed for marine transport in accordance with the appropriate preparation for shipment manual.

4. Marine Shipment

Aircraft shipped by marine mode must be stowed below deck. Weather deck shipment is a high-risk option and should be considered only as a last resort. This is particularly true of UH-1 and OH-58 series helicopters because of inadequate tiedown provisions. Rotor blades shall be removed from all aircraft shipped above deck. The corrosive effects of above deck transport must be considered. The shrink wrap usually does not stand up to the weather conditions seen above deck. Careful stow planning is required to ensure that larger aircraft will fit and can be maneuvered below deck. The height is the major concern.

5. Responsibility

Aircraft maintenance personnel must provide technical assistance and supervise lifting and tiedown (lashing) of the aircraft on its transporter. During transport, the helicopter is the responsibility of the shipping unit.

Section II. REQUIRED LOADING EQUIPMENT

This is an outline of the resources required for shipment that must be provided at the POE through a combination of PSA and deploying unit assets. Coordination is essential to ensure the availability of assets, manpower, equipment, and materials at the POE and is the responsibility of the deploying unit. Availability of the following must be considered:

A. Disassembly of aircraft.

1. Aircraft shipping and maintenance manuals.

2. Tow bars, towing bridles, and vehicles.

3. Crane trucks, self-propelled crane, aircraft maintenance and positioning (SCAMP), and forklifts.

4. Fuel truck (to fuel/defuel aircraft).

5. Maintenance stands.

6. Generator Power Unit (GPU) or Auxiliary Ground Power Unit (AGPU).

7. Aircraft covers (flyaway gear).

8. Grounding cables.

9. Shrink film equipment and materials.

10. General mechanics tool sets and special tools required for aircraft disassembly /assembly.

11. Fire fighting equipment.

12. Fire truck (coordinate through port facility).

13. Combustible gas indicator with certified operator (coordinate through port facility).

14. Tiedown devices and tag lines (rope).

15. Lifting devices, special slings, adapters, and other hoisting equipment as specified in the aircraft manual.

16. Main rotor blade boxes (for removed rotor blades).

17. Main rotor blade slings (to remove main rotor blades).

18. Blade folding tools/fixture.

19. Ground handling wheels.

20. Armament tool sets.

21. Rocket pod/missile launcher containers.

22. Crates for removed components (see TM 38-230-2). Tags and zip-lock bags are useful for storing hardware and some components. Plastic bubble wrap is needed to protect sensitive components that must be removed.

23. Wheel chocks.

24. Spare tires for helicopters.

25. Cherry picker or similar personnel lifting device for lifting personnel for helicopter rigging for lift-on-lift-off operations.

B. Assembly of aircraft

1. Bore sight equipment.

2. Pitot static system tester.

3. Appropriate tracking and balancing equipment or the Army Vibration Analyzer (AVA).

Ground handling and lifting devices must accompany the aircraft and be readily accessible for unloading at the POD.

Section III. PREPARATION FOR SHIPMENT

A. Planning

Predeployment planning is essential to a successful deployment of aviation assets. Upon receipt of the port call, the deploying unit transportation officer should proceed as follows:

1. Contact the designated staging area commander at the POE.

2. Provide the POE point of contact with the characteristics of the equipment to be shipped (dimensions and weight) and any tactical consideration impacting the shipping configuration of the aircraft.

The deploying unit should coordinate POE support requirements directly with PSA only after coordination has been made with the POE terminal/port commander. Port support for Forces Command (FORSCOM) Aviation units may be provided by selected elements of Army National Guard (ARNG) Aviation Classification and Repair Activity Depots (AVCRADs) through the Mobilization AVCRAD Control Element (MACE). These elements are capable of providing a wide range of services to deploying aviation units to include aircraft preparation, preservation (to include application of shrink film), maintenance support through Aviation Intermediate Maintenance (AVIM), and technical assistance on loading and tiedown. Request MACE assistance through the chain of command to: Commander, Mobilization AVCRAD Control Element, Bldg E4305 (Edgewood Area), Aberdeen Proving Ground, MD 21010-5401, telephone DSN 584-2635 or (410) 671-2635. PSAs for other MACOMs are assigned by the MACOM deployment regulation (55-1). Timely notification is necessary to ensure adequate support.

B. Shipping Configuration

Aircraft configuration will be in accordance with the shipping manual. The configuration required for aircraft shipment will be determined by the following:

1. Mode of transportation.

2. Type of transporter.

3. Tactical deployment.

For tactical deployments, disassembly should be kept to an absolute minimum to minimize assembly/depreservation time at POD.

C. Shipping Responsibility

Army aircraft shall be preserved and prepared for shipment in accordance with the applicable preparation for shipment manual. The shipper/deploying unit prepares the aircraft for shipment as follows:

1. Provide equipment and manpower.
2. Requisition the required preservatives.
3. Package removed parts and equipment.
4. Preserve the aircraft as required in the shipping manual.
5. Adjust fuel level per the recommended fuel system preparation.
6. Apply heat shrink film protective covering materials.
7. Arrange for transport equipment.
8. Assist staging area personnel in the loading and tiedown of the aircraft.

Supply of the material is to be accomplished through the normal supply channel.

D. Shipping Precautions

1. For marine modes, shipment of helicopters on the weather deck of a vessel is a high-risk option, structurally and due to the corrosive environment.
2. OH-58 and UH-1 series helicopters have deficient tiedown provisions.
3. Do not push UH-60 or AH-64 helicopters up the ramp. Tow only.
4. Use towing bridles as required.
5. Avoid stepping on tiedown chains to avoid damage to the helicopter restraint provisions.
6. Make sure lifting and/or tiedown provisions are not covered up by shrink wrap.
7. Do not over tension tiedown chains or damage may occur to tiedown provisions.

Section IV. PREPARATION GUIDELINES FOR HELICOPTERS

A. General Guidelines

1. Color code rotating components (blades, controls, etc.) prior to removal.

2. Tag all removed components.

3. Bag, tag, and attach removed hardware to aircraft or removed component as appropriate.

4. Preserve and package removed components in special reusable containers or crates as appropriate.

5. Mark each container, crate, and helicopter with contents, gross weight, and center of gravity.

6. Adjust fuel level (see fuel system preservation guidance).

7. Install flyaway gear (intake covers, exhaust covers, pitot tube covers, etc.).

8. Use wing walkers and brakemen for all towing and ground handling.

9. Provide technical assistance to the staging area commander. Establish a rapport with the commander and a unit technical focal point.

Aviation units should arrive at POE with the necessary equipment available for both roll-on/roll-off (RORO) loading and lifting.

B. Helicopter Preparation

Refer to appropriate aircraft preparation for shipment technical manual (see bibliography).

C. Helicopter Preservation for Shipment

1. Besides assets, manpower, equipment, and materials needed at the POE (listed under air/marine shipment), all helicopters must be preserved in accordance with the preparation for shipment manual. Preservation for vessel shipment is similar to preservation for intermediate storage. Refer to appropriate aircraft preparation for shipment technical manual for helicopter preservation procedures.

2. The extent of preservation required for the fuel system is identified in the appropriate technical manuals.

3. Heat shrink film materials, equipment, installation instructions, and manpower requirements are provided in appendix G of shipping manuals. Apply heat shrink film protective covering on all military helicopters being shipped via the marine mode regardless of the location of the helicopter on the vessel. Protective covering will be applied to those helicopters being shipped by tractor-trailer on highways. The level of protection required for short-distance shipments will be determined by the shipper.

NOTE: When applying shrink wrap film, make sure lifting and tiedown provisions are accessible

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Section V. INTRANSIT CARE

It is recommended that two aviation personnel accompany aircraft on vessel shipment to perform supercargo duties. Duties of the supercargo include the following:

A. Providing security for aircraft.

B. Inspecting shrink film covers daily for damage.

C. Making repairs to shrink film and draining any condensation as required.

D. Inspecting for fluid leaks - particularly fuel.

E. Maintaining proper tiedown tension.

F. Maintaining proper tire and strut inflations.

G. Rigging helicopters and providing technical supervision for offloading.

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Lifting Guide for Helicopters

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AH-64 Apache **A-55**

Lifting Procedure

The lifting guide is mainly used for land and marine transport. Below are the helicopter lifting guidelines.

A. General

1. Use the lifting procedures published in the shipping manual.

2. Inspect all lifting equipment prior to movement to the staging area.

3. Replace all defective equipment; inspect equipment again prior to use.

4. Helicopters will be rigged for lifting only by properly trained aircraft maintenance personnel on unit orders to supervise lifting operations, using the appropriate technical manuals.

5. Tag lines will be attached to each helicopter at a minimum of three (AH-64, UH-60 series) or four points (all others).

6. Ground handling and lifting devices must accompany each aircraft shipment and must be readily accessible for unloading.

7. For UH-1, AH-1, AH-64, or other helicopters, without longer, multileg, slings, attach a short pendant (3'- 5') below the crane hook. Pendant will allow some clearance if the hook is not centered on the main rotor mast for connection.

8. The notation "F.S." refers to the fuselage station of the helicopter.

B. Helicopter Hoisting

1. OH-58A/C aircraft have two interchangeable styles of main rotor retaining nuts. Ensure that the lifting adapters are available for both styles. Both adapters are of local manufacture and are presented in this reference (page A-40 & A-41).

2. The “figure eight” strap rotor head lift for two-bladed bell helicopters is no longer approved. Use the lifting clevis described in the appropriate preparation for shipment manual.

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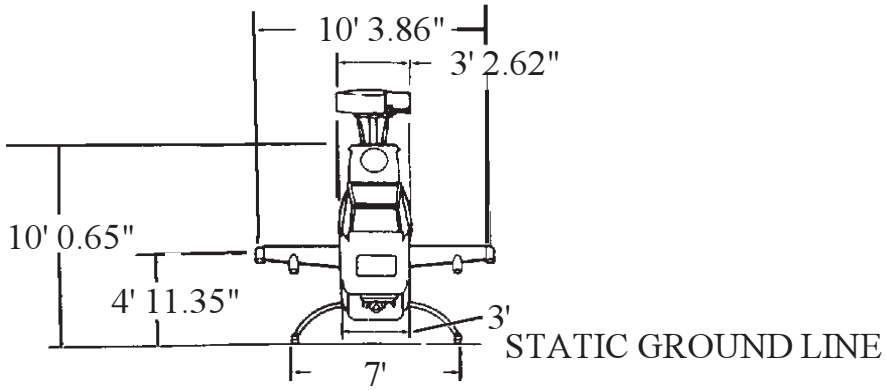
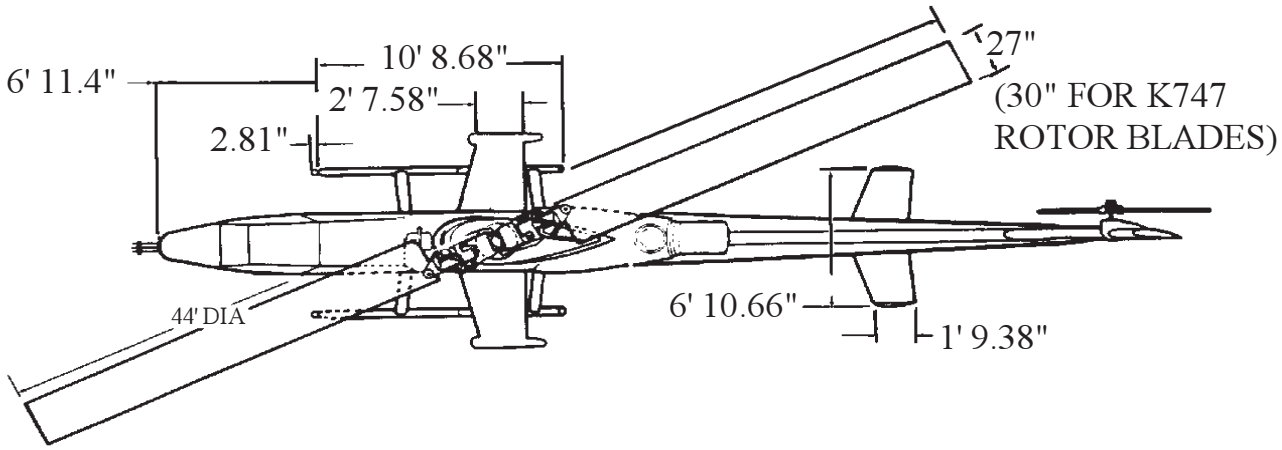
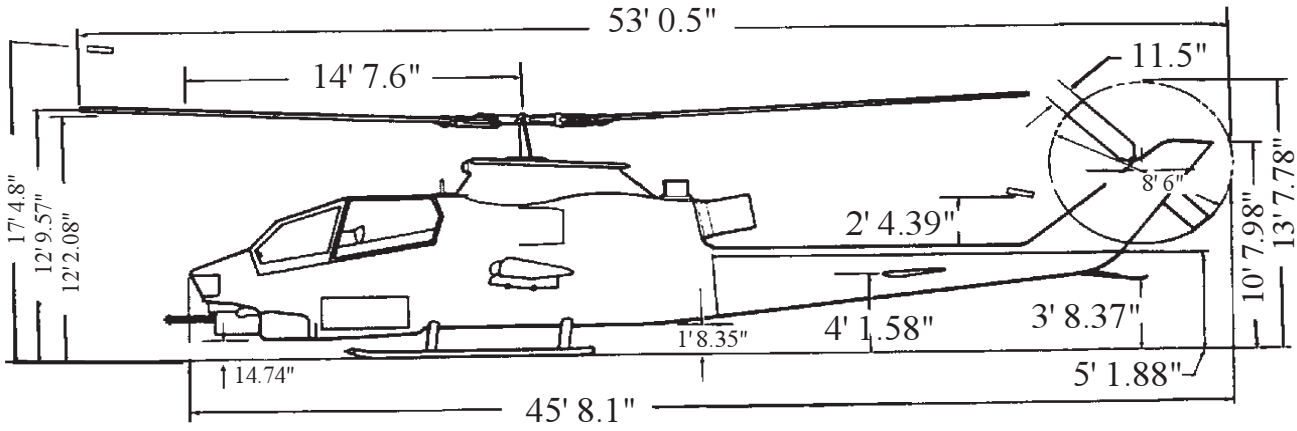
AH-1E/F/P Cobra

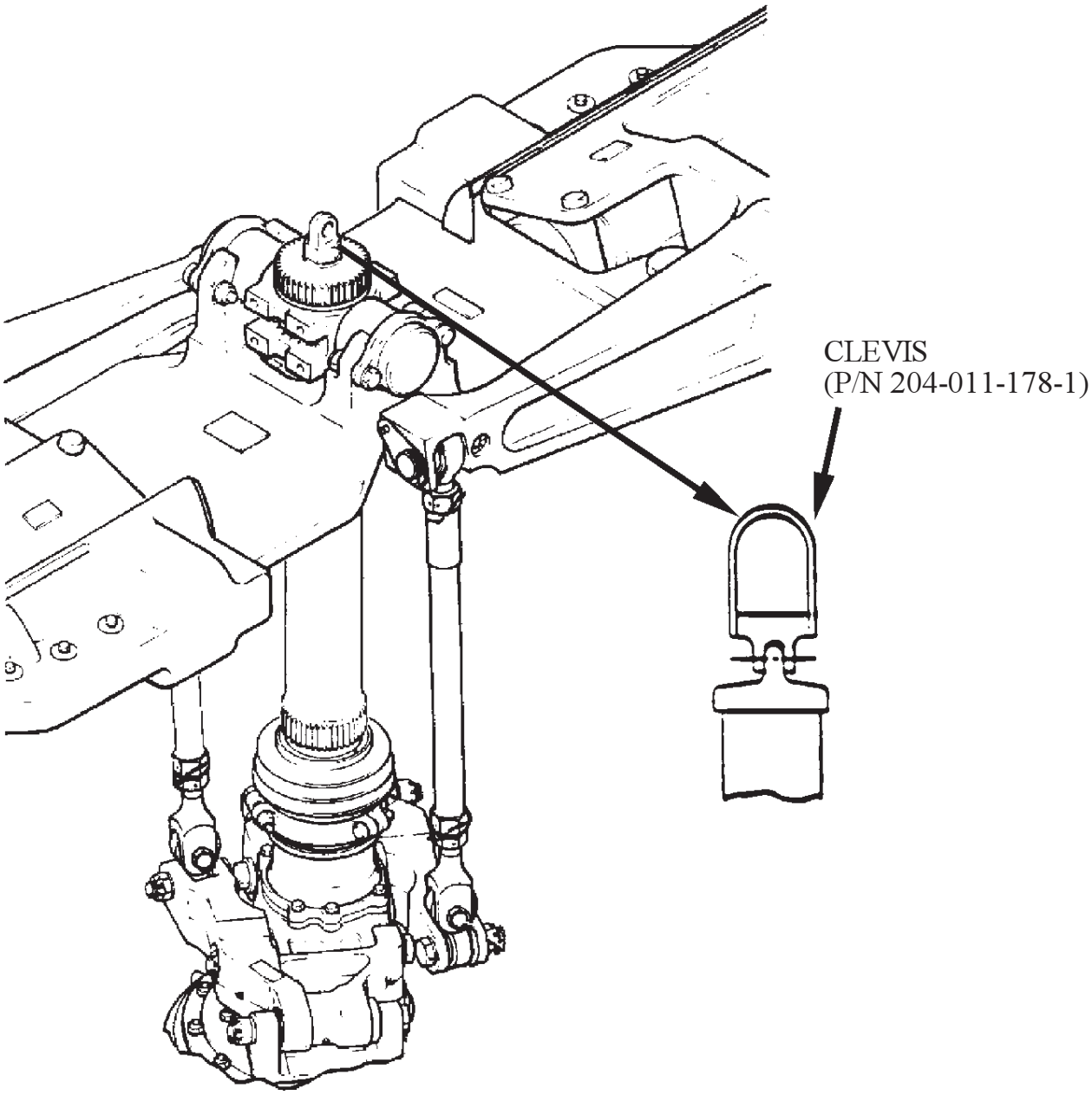
AH-1E/F/P Principal Dimensions







Rotor Head for AH-1 Series Helicopter



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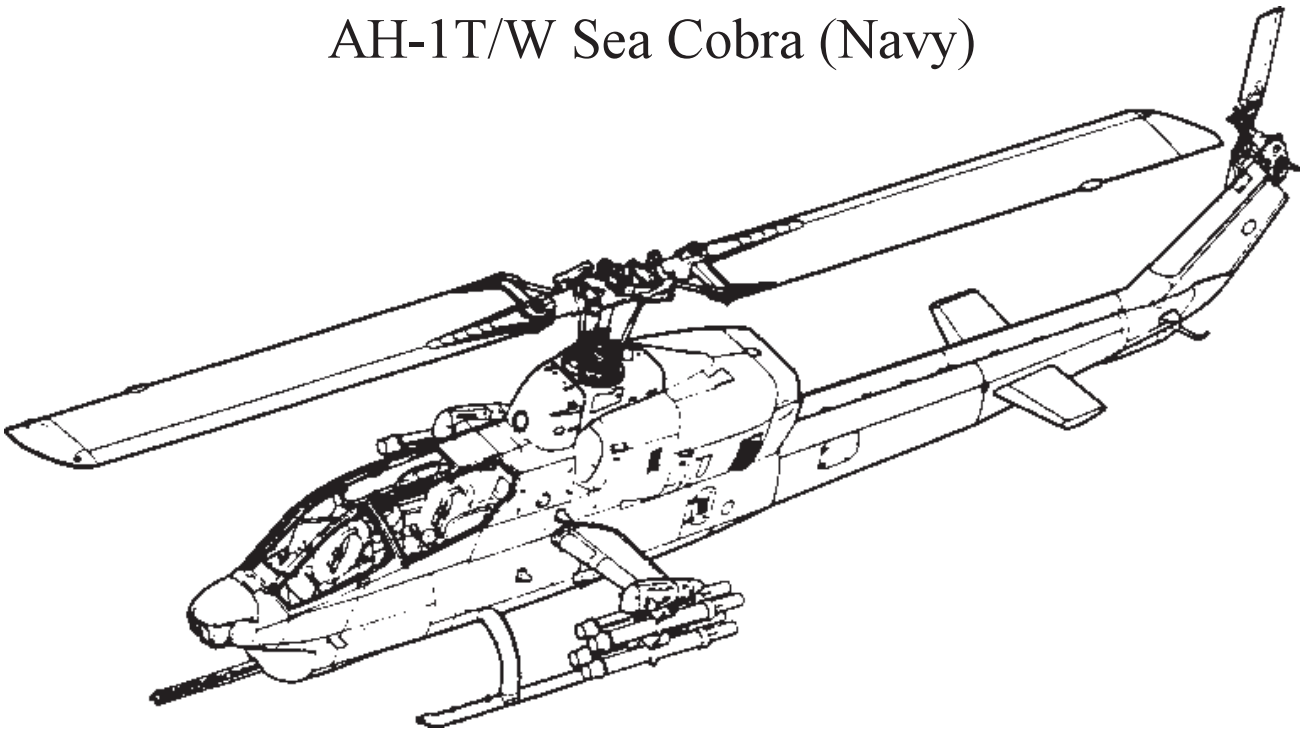
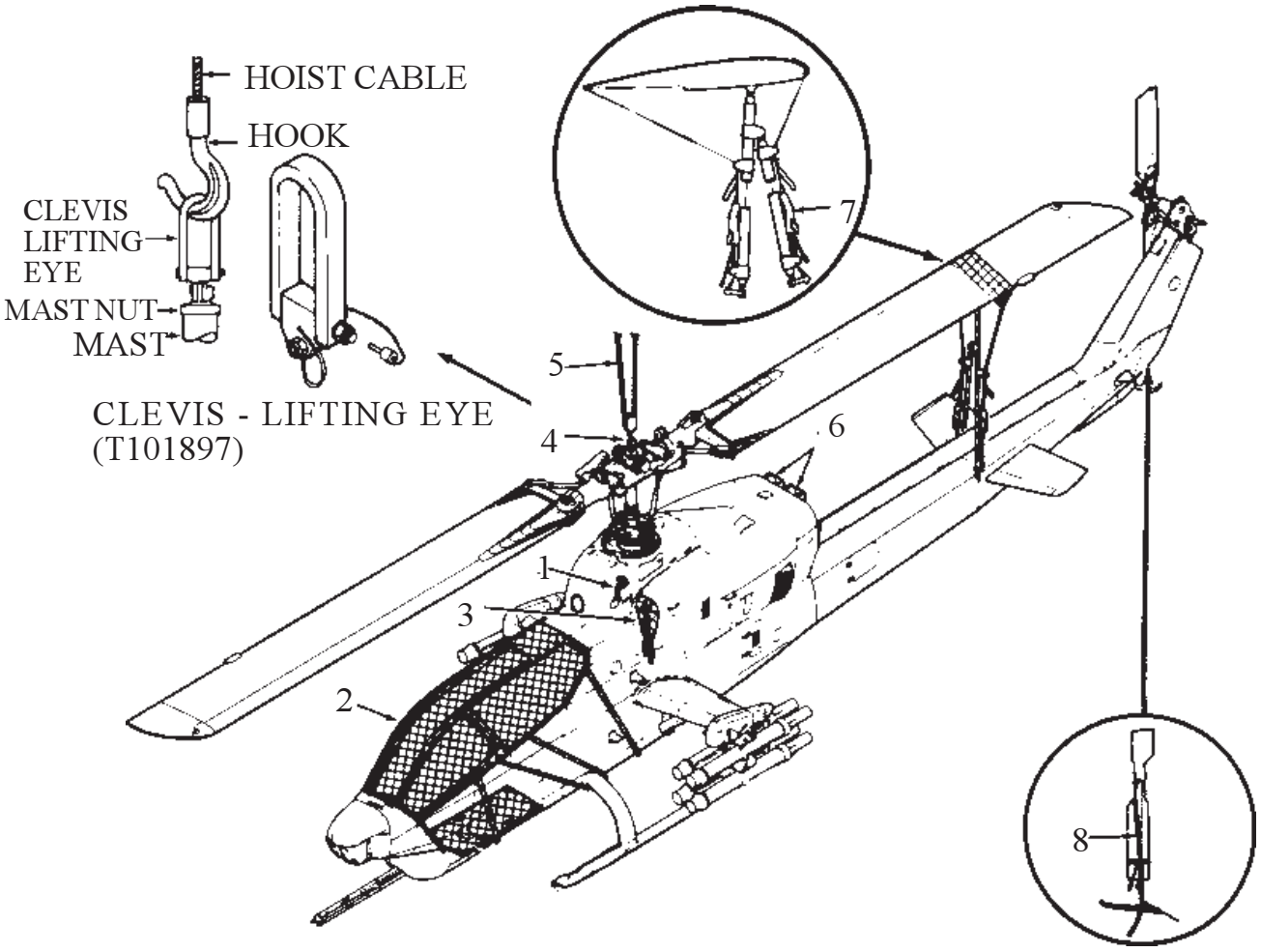
AH-1T/W Sea Cobra (Navy)



DIMENSIONS	AH-1T	AH-1W
ROTOR DIAMETER	48 FT	48 FT
LENGTH (OVERALL)	58 FT	58 FT
LENGTH (FUSELAGE)	45 FT 6 IN	46 FT
HEIGHT (MAST)	13 FT 9 IN	13 FT 9 IN
HEIGHT (TOP OF TAIL ROTOR)	14 FT 2 IN	14 FT 2 IN
WIDTH (MINIMUM)	10 FT 8 IN	10 FT 8 IN
WEIGHTS (IN POUNDS)		
BASIC	9,000	10,200
MAXIMUM TAKEOFF/LANDING	14,000	14,750
MAXIMUM HOISTING	14,000	14,750
MAXIMUM JACKING	9,600	12,800
MAXIMUM TOWING	13,560	14,750

Hoisting AH-1T/W Helicopter



1. PITOT TUBE COVER
2. CANOPY COVER
3. POWER SECTION INLET SHIELD (2)
4. LIFTING EYE CLEVIS
5. HOIST
6. POWER SECTION EJECTOR COVER (2)
7. TIEDOWN SUPPORT
8. TIEDOWN

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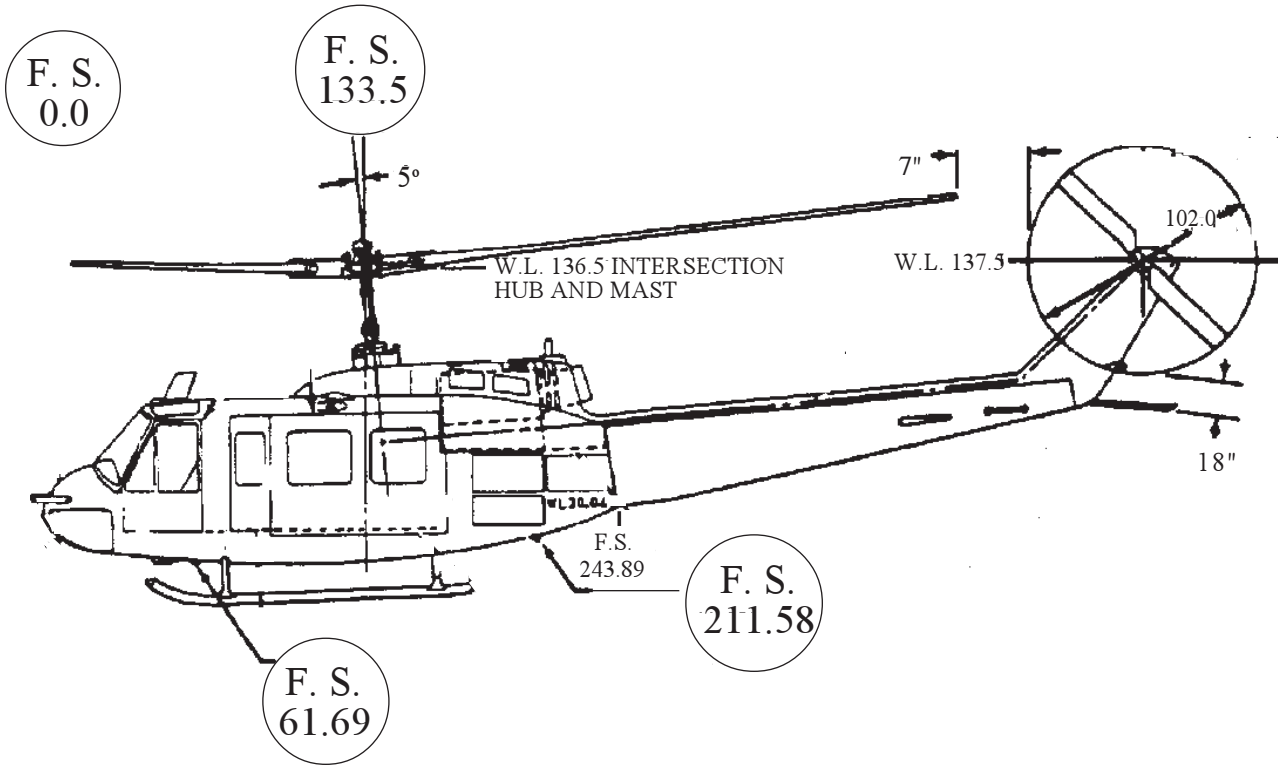
UH-1E/F/H/V Iroquois

UH-1 ROTORHEAD

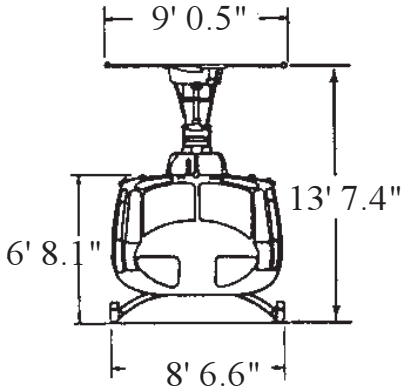
UH-1E/F/H, Utility Helicopter

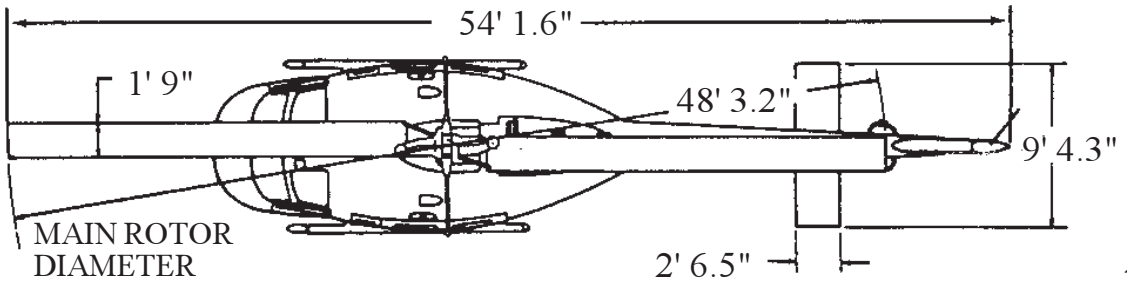


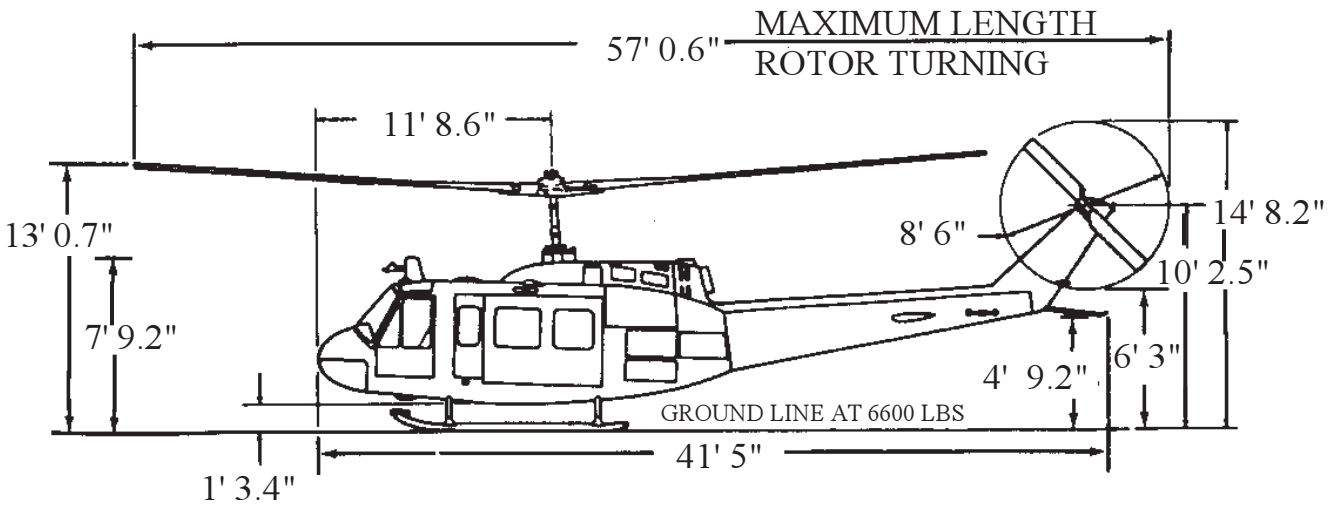
NOMENCLATURE	DIMENSIONS (IN.)			WEIGHT (LB)
	LENGTH	WIDTH	HEIGHT	
UH-1E	283[1]	101[2]	126	6,450[1]
UH-1F/H	497[3]	103[2]	126	6,500[1]

[1] Excludes rotor blades, stabilizer bar assembly, main rotor hub and swash plates assembly, tail rotor blades, elevator, and tail boom. Tail boom is stowed on top of fuselage.
[2] Width with elevator and stabilizer removed.
[3] Fuselage length with rotor removed.

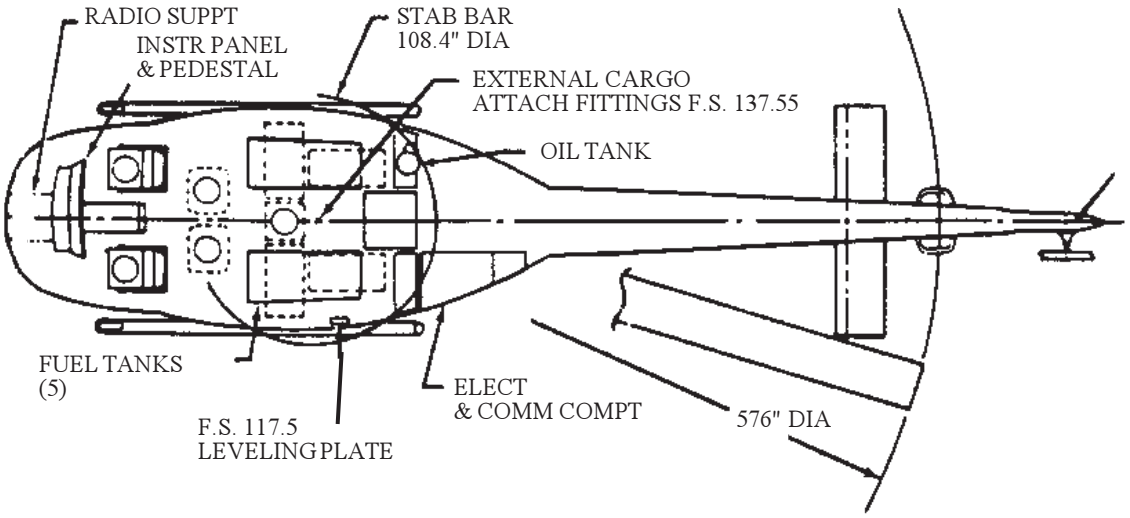
UH-1H, Principal Dimensions

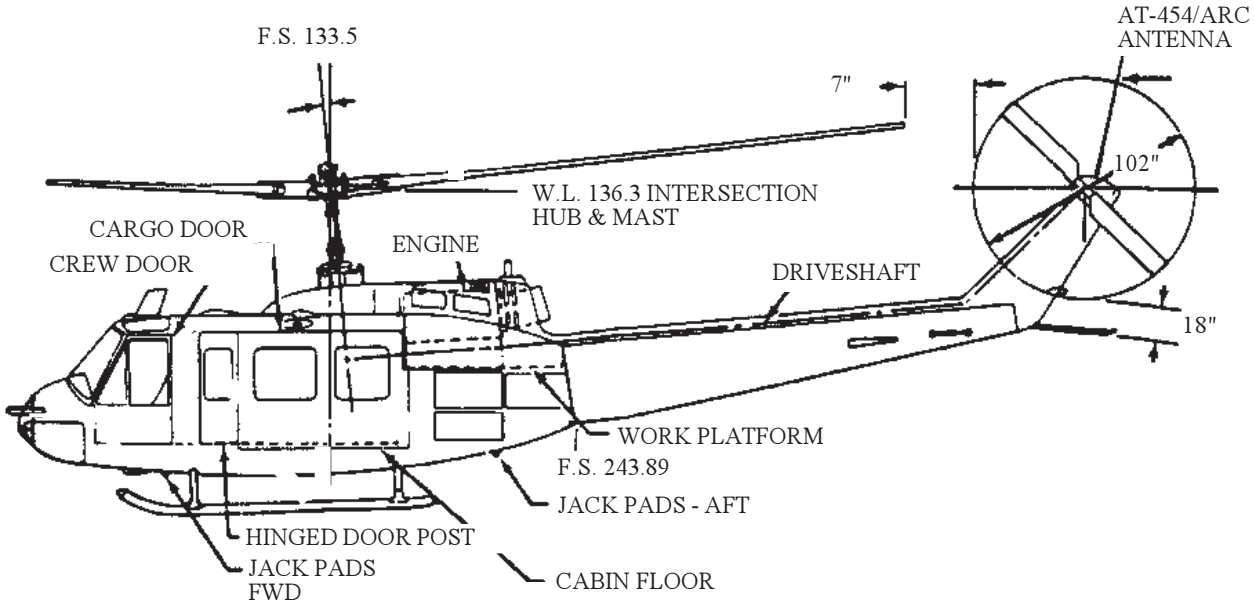




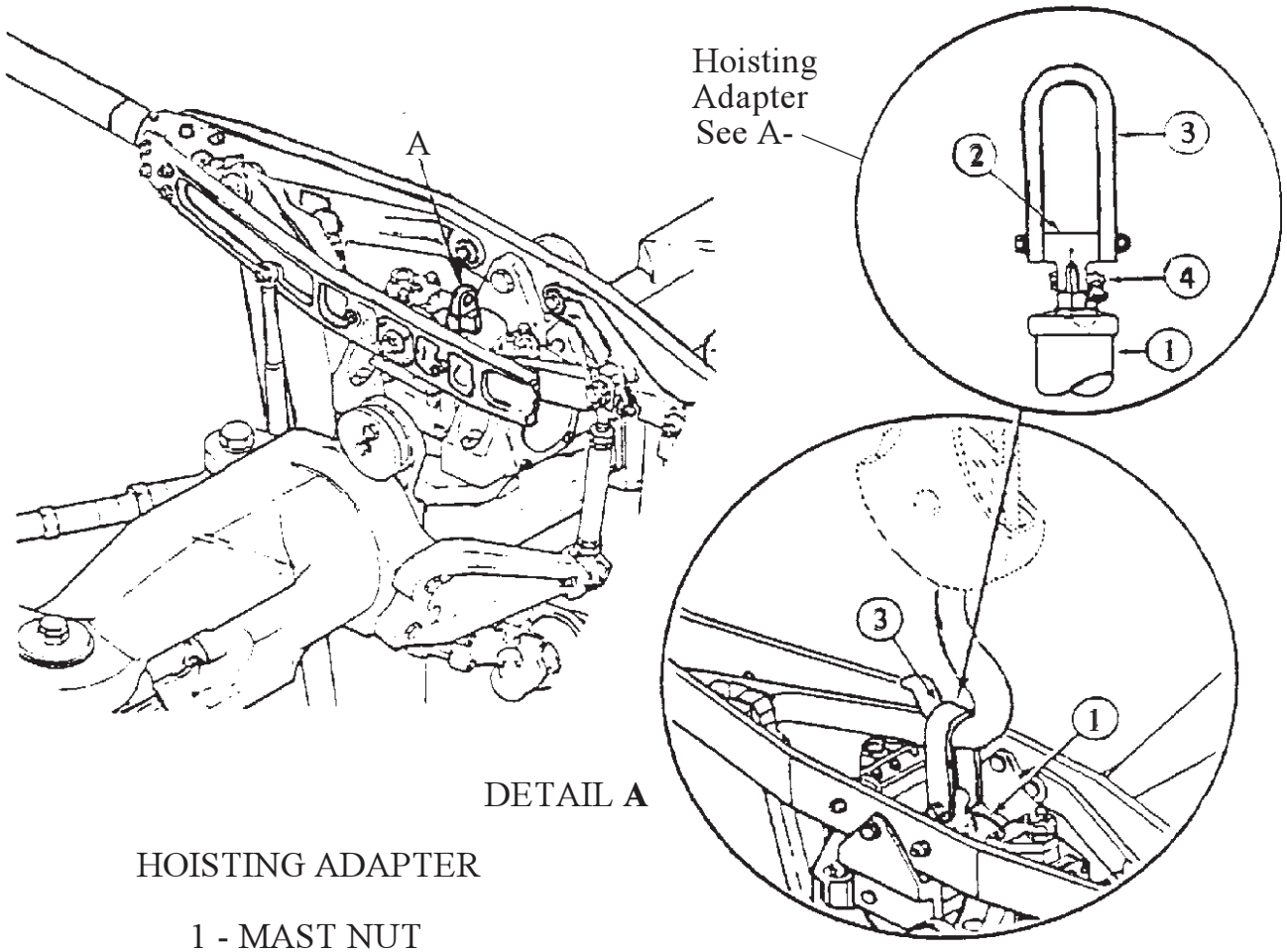


UH-1H/V Helicopters





Rotor Head for UH-1 Helicopters



DETAIL **A**

HOISTING ADAPTER

1 - MAST NUT
2 - CLEVIS
3 - STRAP
4 - PIN

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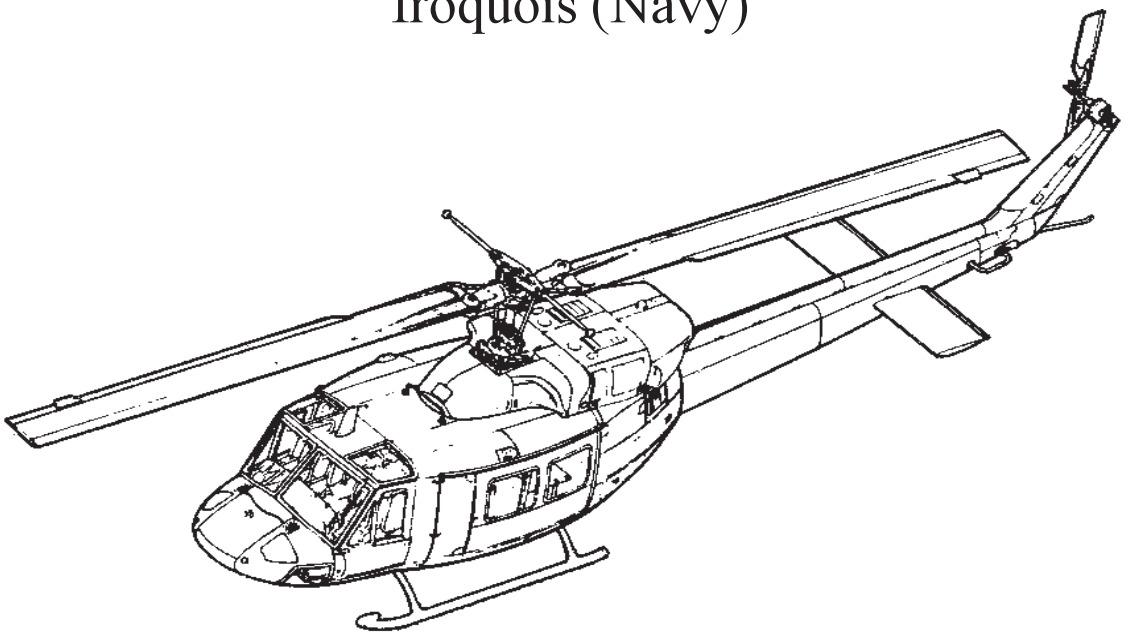
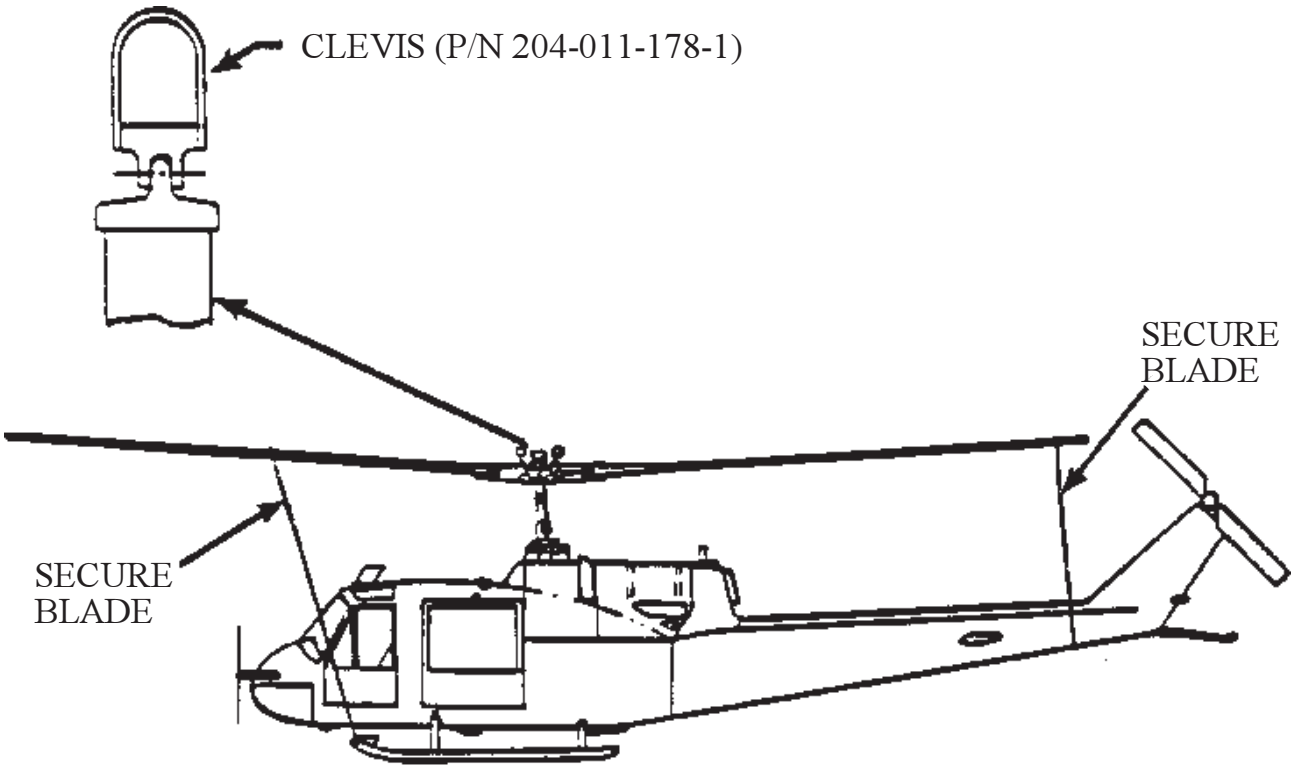
UH-1 and UH-1N
Iroquois (Navy)



DIMENSIONS	UH-1	UH-1N
ROTOR DIAMETER	44 FT	48 FT
LENGTH (OVERALL)	52 FT 11 IN	57 FT 4 IN
LENGTH (FUSELAGE)	42 FT 8 IN	42 FT 5 IN
HEIGHT (MAST)	12 FT 8 IN	13 FT 1 IN
HEIGHT (TOP OF TAIL ROTOR)	13 FT 10 IN	19 FT
WIDTH (MINIMUM)	9 FT 5 IN	9 FT 5 IN
WEIGHTS (IN POUNDS)		
BASIC	5,240	6,300
MAXIMUM TAKEOFF/LANDING	9,500	10,500
MAXIMUM HOISTING	9,500	10,500
MAXIMUM JACKING	9,500	10,500
MAXIMUM TOWING (UNPREPARED SURFACE)	7,400	9,500
MAXIMUM TOWING (PREPARED SURFACE)	9,500	10,500

Hoisting of UH-1 and UH-1N Iroquois



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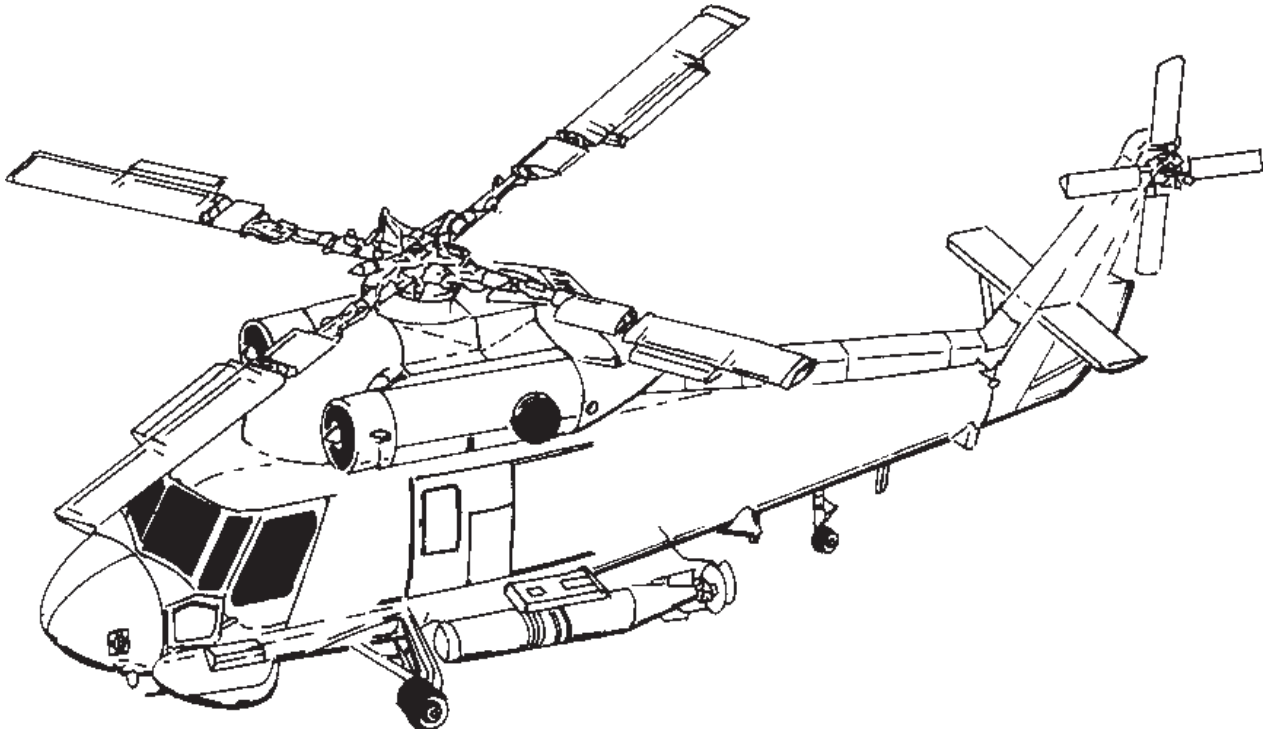
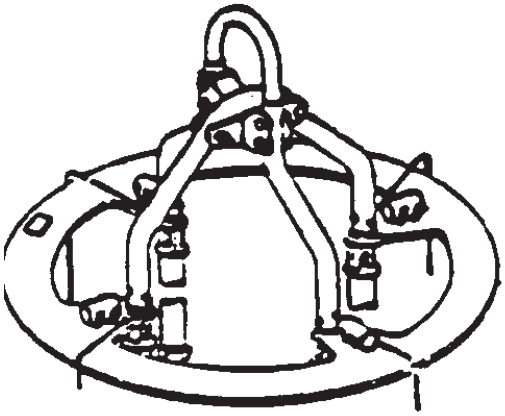
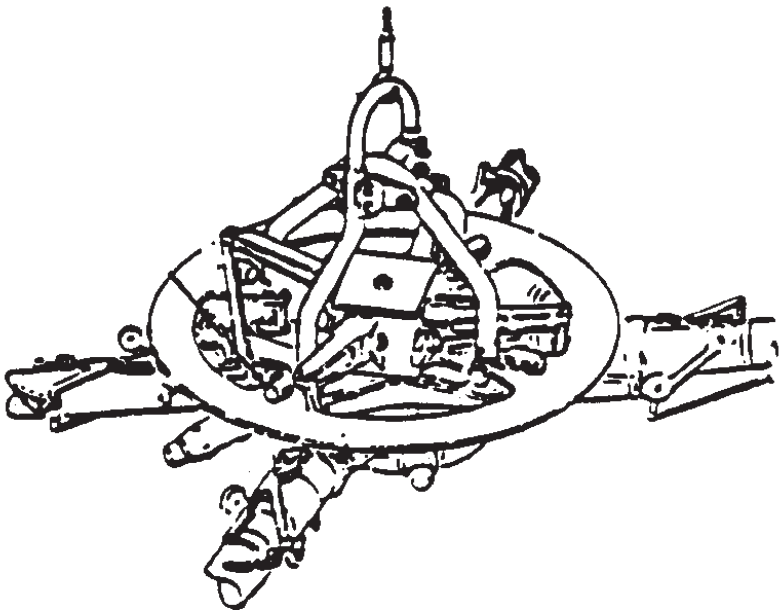
H-2 Sea Sprite (Navy)



DIMENSIONS	AH-1T
ROTOR DIAMETER	44 FT
LENGTH (OVERALL)	52 FT 7 IN
LENGTH (FUSELAGE)	40 FT 6 IN
LENGTH (BLADES FOLDED, NOSE DOORS OPEN)	38 FT 4 IN
HEIGHT (MAST)	13 FT 7 IN
HEIGHT (TOP OF TAIL ROTOR)	15 FT 1 IN
WIDTH (MINIMUM)	12 FT 3 IN
WEIGHTS (IN POUNDS)	
BASIC	8,618
MAXIMUM TAKEOFF (INTERNAL)	11,600
MAXIMUM TAKEOFF (EXTERNAL)	13,500
MAXIMUM HOISTING	6,500
MAXIMUM JACKING	13,500
MAXIMUM TOWING	13,500

H-2 Sea Sprite
Helicopter "Birdcage" Hoisting Sling





PART NUMBER K604010-5

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H-3 Sea King (Navy)

DIMENSIONS	H-3
ROTOR DIAMETER	62 FT
LENGTH (OVERALL)	72 FT 11 IN
LENGTH (FUSELAGE)	55 FT 3 IN
LENGTH (BLADES AND PYLON FOLDED)	47 FT 3 IN
HEIGHT (MAST)	15 FT 7 IN
HEIGHT (TOP OF TAIL ROTOR)	17 FT 2 IN
WIDTH (MINIMUM)	17 FT 7 IN
WEIGHTS (IN POUNDS)	
BASIC*	13,100-16,475
MAXIMUM TAKEOFF*	19,100-21,000
MAXIMUM HOISTING	20,000
MAXIMUM JACKING*	19,100-21,000
MAXIMUM TOWING*	19,100-21,000
* VARIES BY MODEL AND BUREAU NUMBER	

H-3 Sea King
Helicopter Hoisting Sling

PART NUMBER S6170-70004-8

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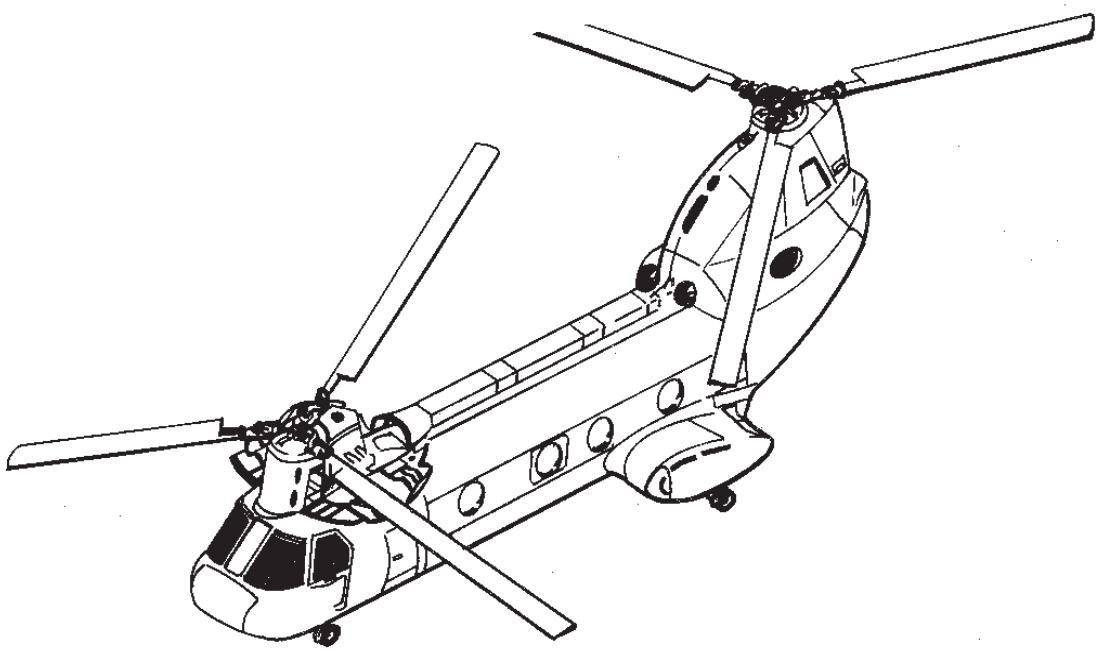
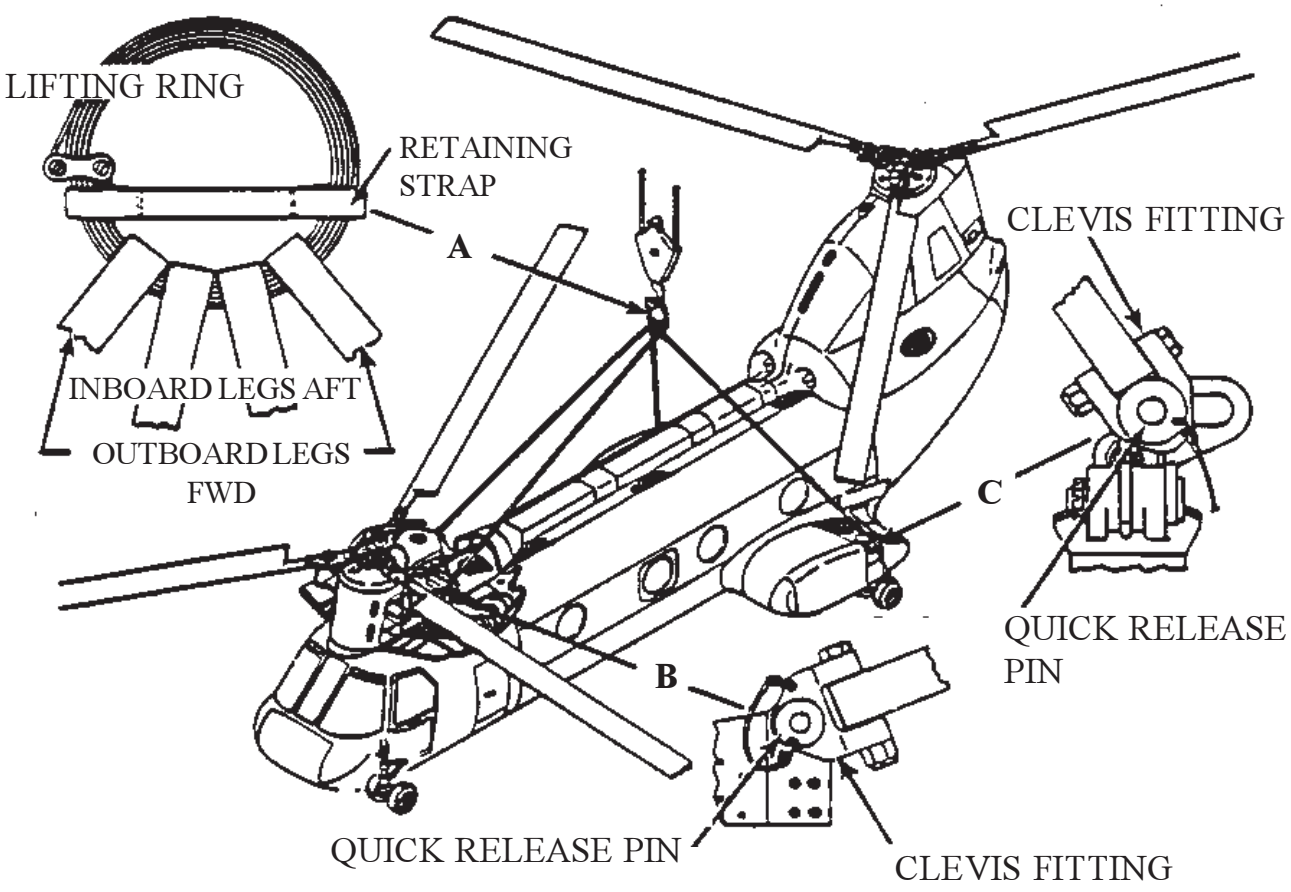
H-46 Sea Knight (Navy)



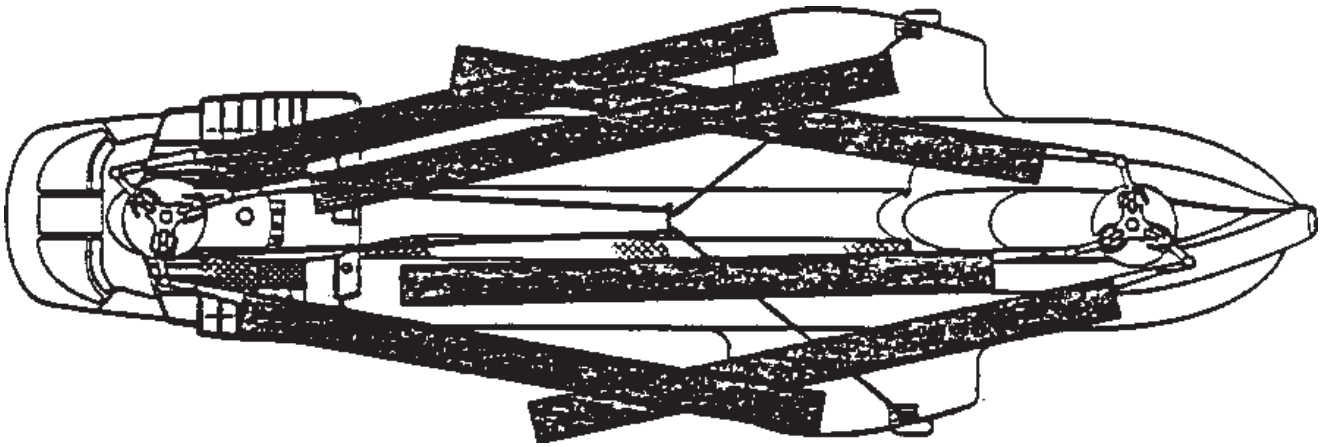
DIMENSIONS	H-46
ROTOR DIAMETER	51 FT
LENGTH (OVERALL - ROTORS STATIC)	71 FT 7 IN
LENGTH (OVERALL - ROTORS TURNING)	84 FT 4 IN
LENGTH (FUSELAGE)	45 FT 8 IN
HEIGHT (AFT MAST)	16 FT 8 IN
WIDTH (MINIMUM)	14 FT 9 IN
WEIGHTS (IN POUNDS)	
BASIC	14,000
MAXIMUM TAKEOFF (INTERNAL)*	23,000-23,300
MAXIMUM TAKEOFF (EXTERNAL)	24,300
MAXIMUM HOISTING	18,000
MAXIMUM JACKING (FUSELAGE)*	15,000-15,300
MAXIMUM JACKING (LANDING GEAR)*	23,000-23,300
MAXIMUM TOWING	23,000
* VARIES BETWEEN A, D, AND E MODELS	

H-46 Sea Knight
Helicopter Hoisting Sling



PART NUMBER A02G1348-1

H-46 Sea Knight Helicopter Hoisting Configuration With Blades Folded



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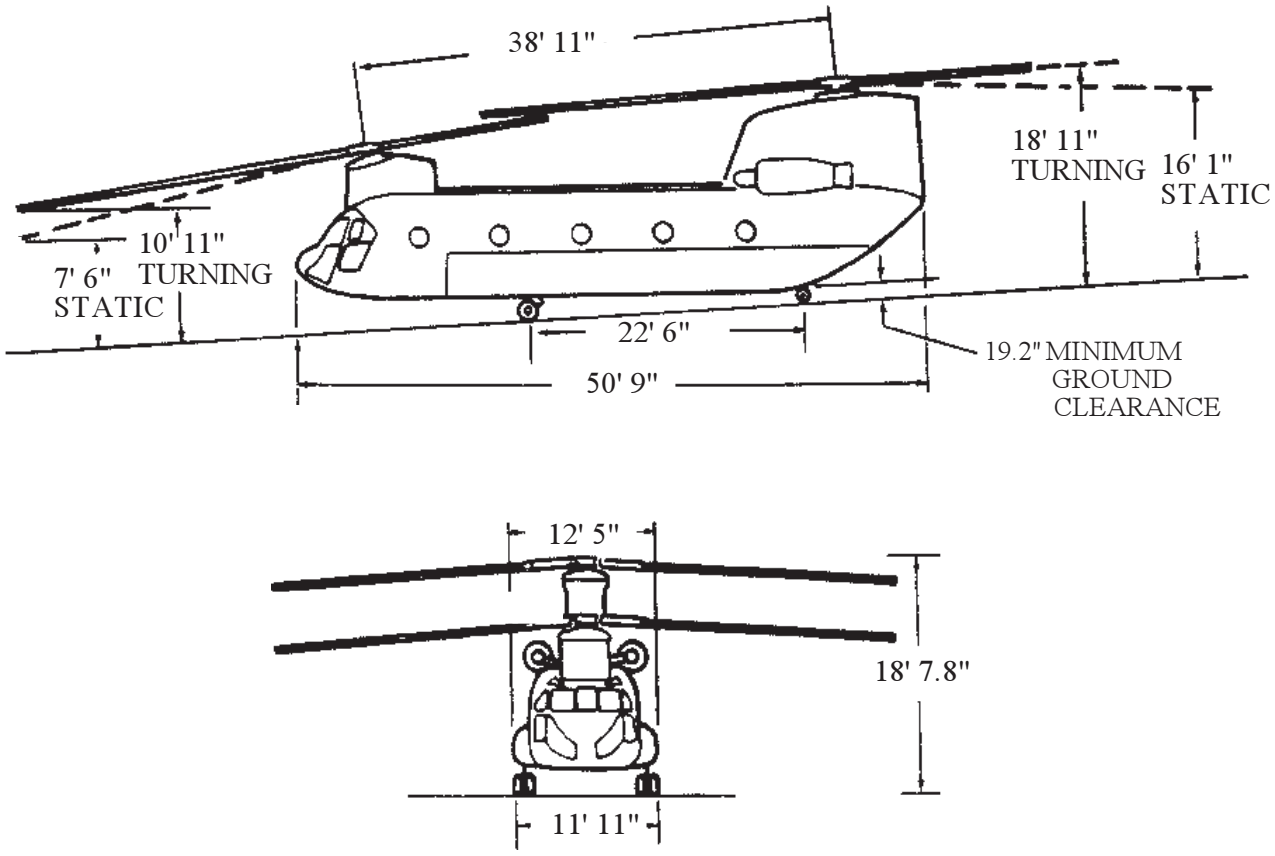
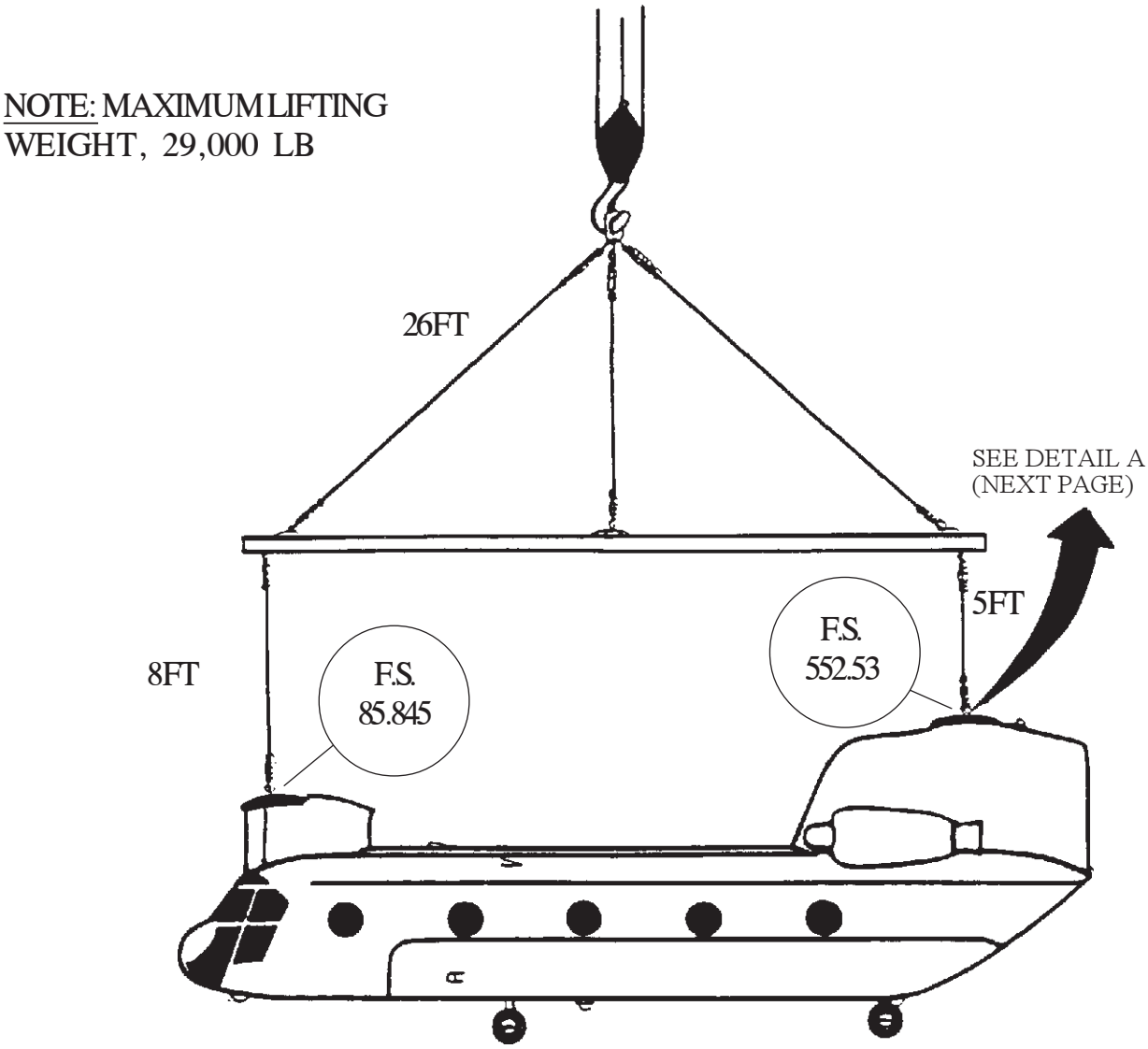
CH-47D/MH-47E Chinook

CH-47D Helicopter



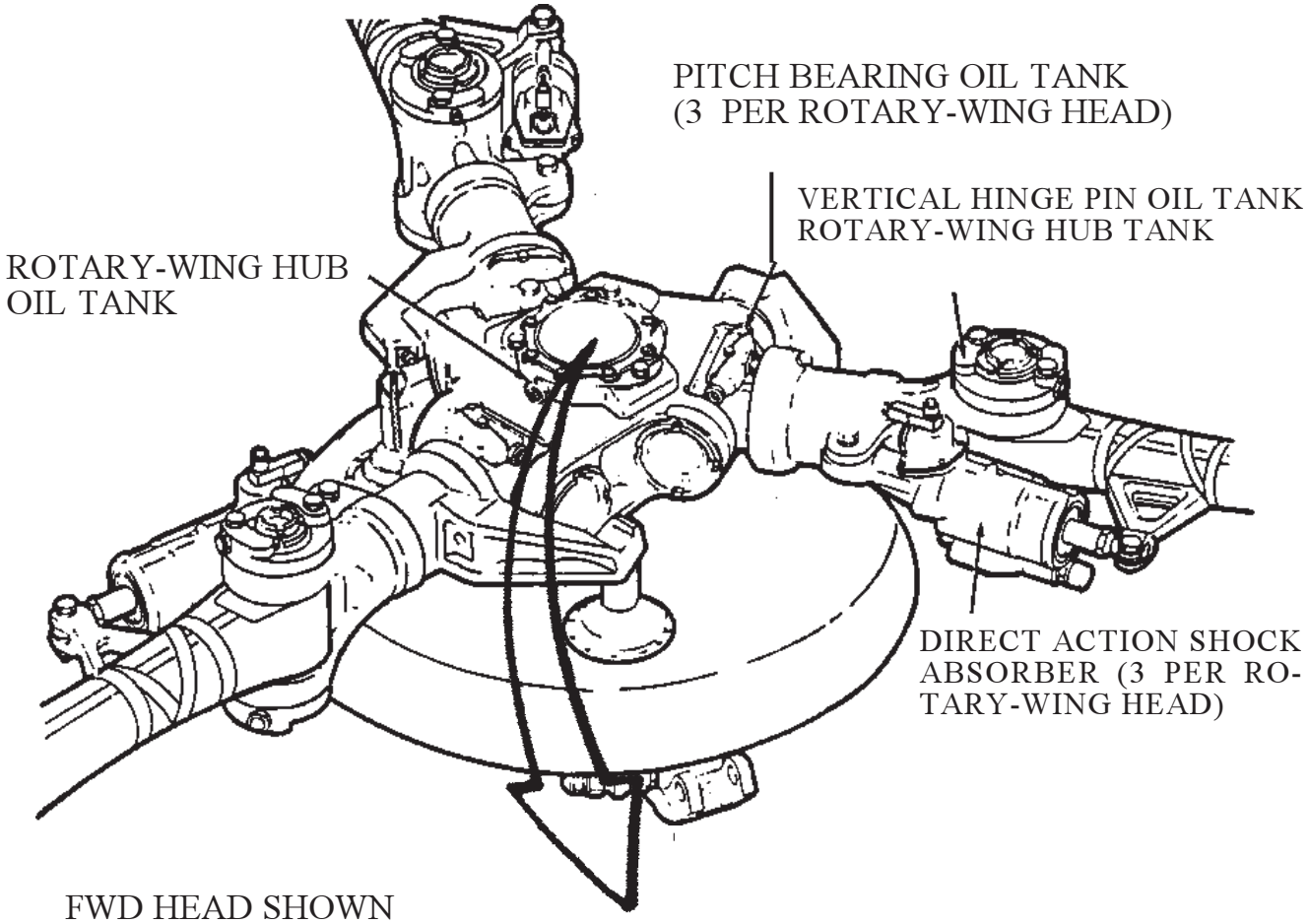
NOMENCLATURE	DIMENSIONS (IN.)			SHIPPING
	LENGTH	WIDTH	HEIGHT	WEIGHT (LB)
CH-47D FUSELAGE	609	160	154	37,000

CH-47D/MH-47E, Cargo Helicopter (Chinook)

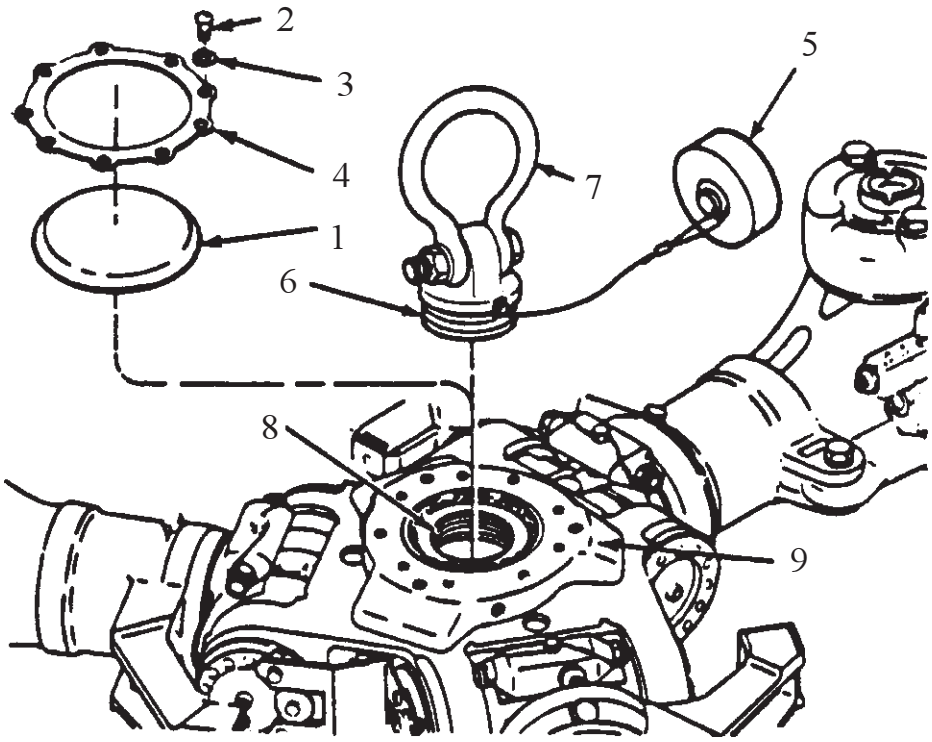


NOMENCLATURE	PART NUMBER	NSN
AIRCRAFT SLING SET (Incl spreader bar)	1730CH47-00-1-1 (81996)	1730-00-135-4637
HOISTING ADAPTER/RING ASSEMBLY FOR FWD SHAFT AND AFT ROTOR SHAFT	114E5909-8	1730-00-010-7462
HOIST ASSEMBLY (Aft transmission)	114E5124-1	1730-00-960-4004
HOIST ADAPTER EYE (Fwd & aft trans)	145E5902-1	1730-01-130-1478
SLING, ROTOR BLADE	145E5911-101	4920-01-115-7001

Detail A


PITCH BEARING OIL TANK
(3 PER ROTARY-WING HEAD)
VERTICAL HINGE PIN OIL TANK
ROTARY-WING HUB TANK
ROTARY-WING HUB
OIL TANK
DIRECT ACTION SHOCK
ABSORBER (3 PER RO-
TARY-WING HEAD)
FWD HEAD SHOWN
AFT HEAD SIMILAR
SEE
DETAIL B

Detail B



1. COVER
2. SCREW
3. WASHER
4. RETAINER
5. COVER
6. RING THREAD
7. RING
8. ROTOR SHAFT
9. OIL TANK

TOOLS:

AIRCRAFT MECHANIC'S
TOOL KIT NSN 5180-00-323-4692
HOIST, 29,000-POUND-CAPACITY
RING ASSEMBLY (T24)(2)
SLING CABLE,
83 FT LONG MINIMUM (2)
GUIDE LINES (2)
TORQUE WRENCH,
0-150 INCH-POUNDS

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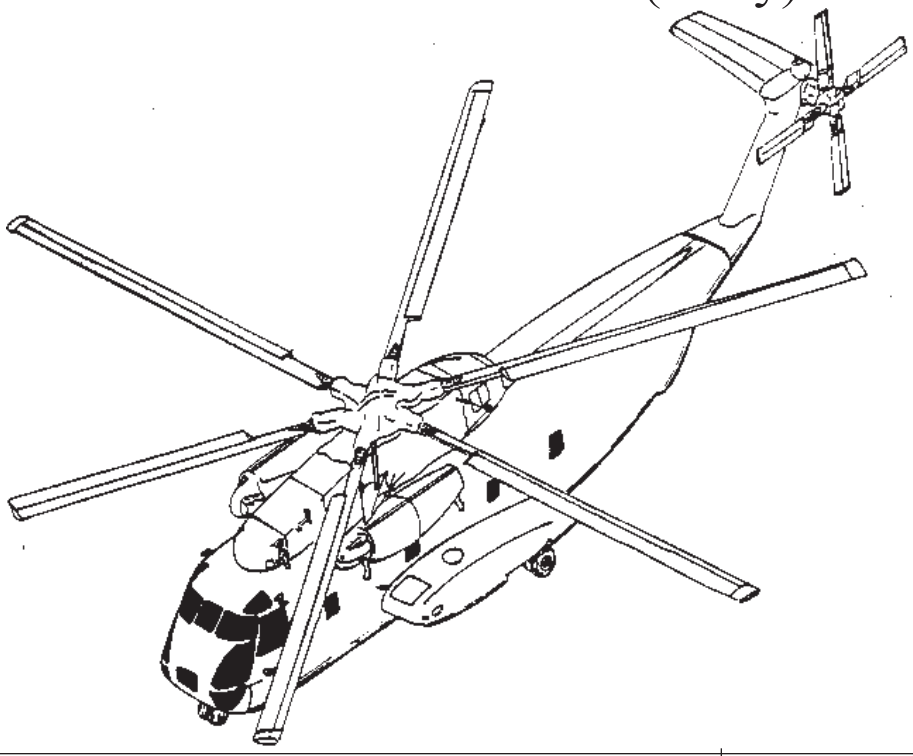
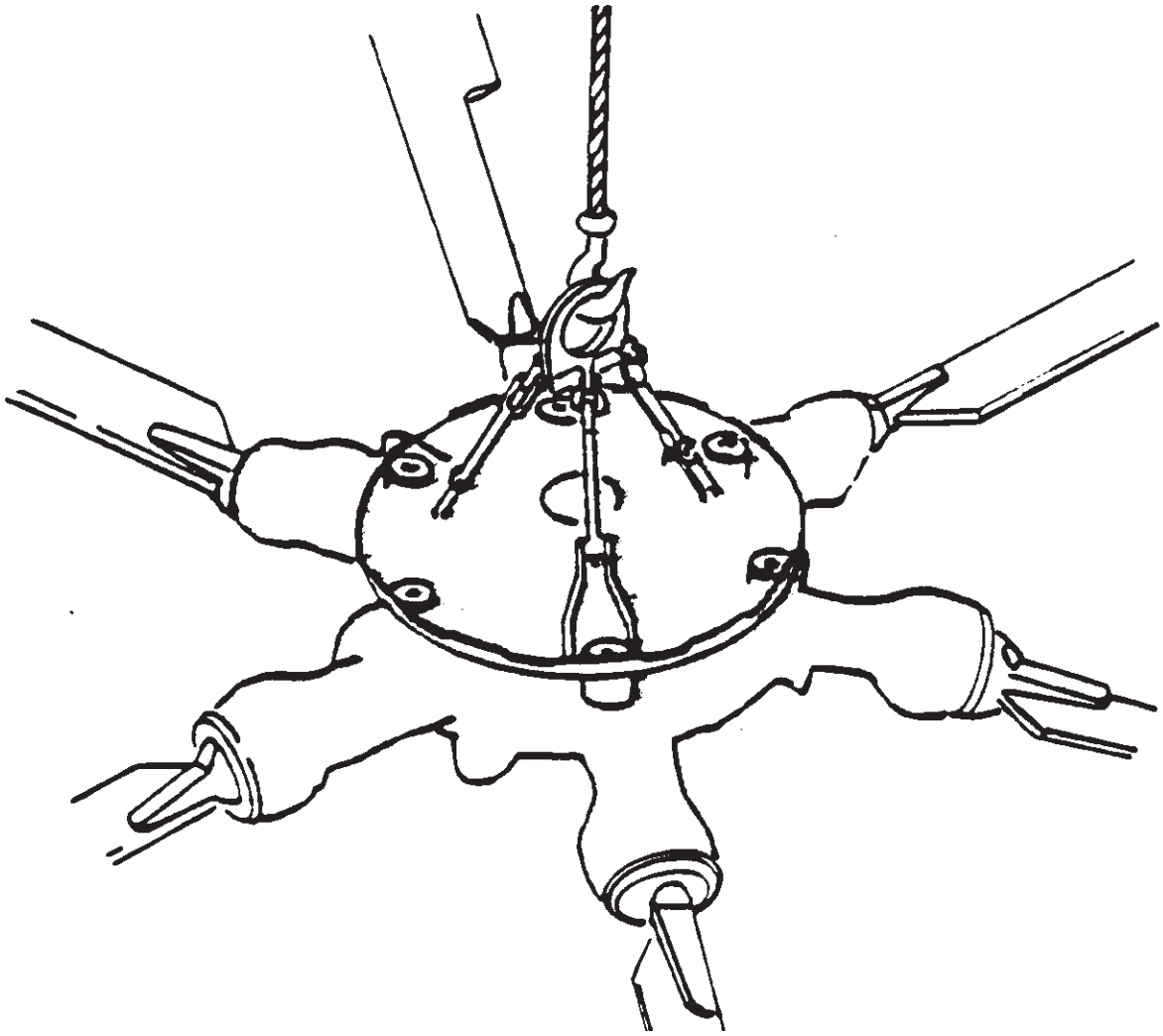
CH-53D Sea Stallion (Navy)



DIMENSIONS	CH-53D
ROTOR DIAMETER	72 FT 3 IN
LENGTH (OVERALL)	88 FT 3 IN
LENGTH (FUSELAGE)	67 FT 6 IN
LENGTH (BLADES AND PYLON FOLDED)	56 FT 9 IN
HEIGHT (MAST)	17 FT 2 IN
HEIGHT (TOP OF TAIL ROTOR)	24 FT 11 IN
WIDTH (MINIMUM)	12 FT 3 IN
WIDTH (WITH AUXILIARY TANKS)	23 FT 11 IN
WEIGHTS (IN POUNDS)	
BASIC*	22,900 & 25,600
MAXIMUM TAKEOFF	42,000
MAXIMUM HOISTING	32,000
MAXIMUM JACKING	42,000
MAXIMUM TOWING	42,000
*WEIGHTS ARE FOR CH AND RH VERSIONS, RESPECTIVELY	

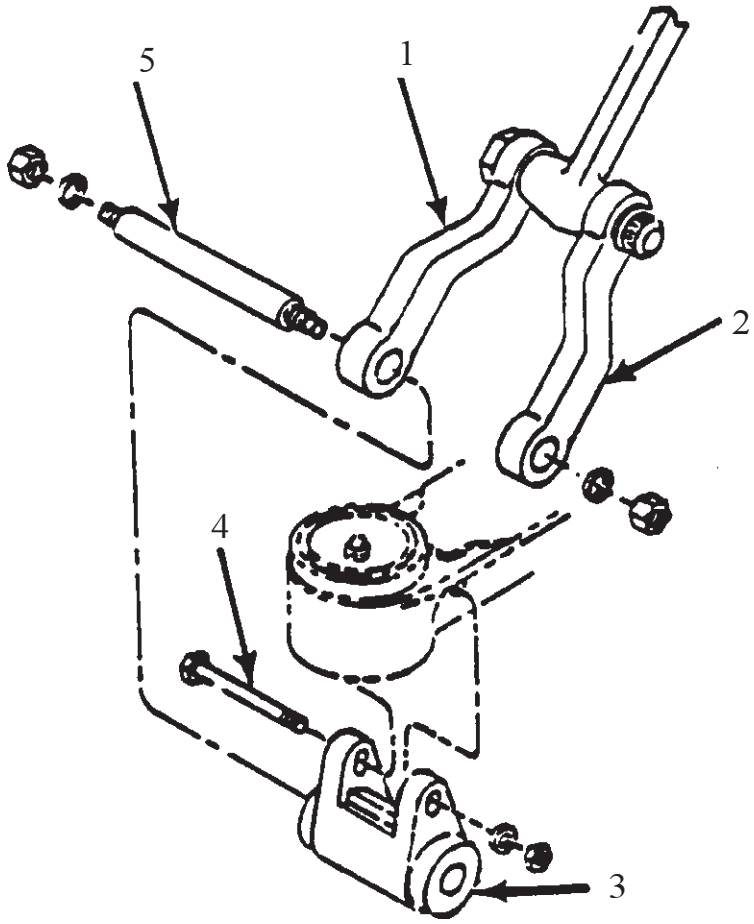
CH-53D Sea Stallion
Helicopter Hoisting Sling



PART NUMBER 65700-70092-042

NOTE: FOR COMPONENT PARTS AND ASSEMBLY DETAILS, SEE NEXT PAGE

CH-53D Sea Stallion
Helicopter Hoisting Sling and Assembly Details



1. LH ARM
2. RH ARM
3. BRACKET
4. BOLT, WASHER, NUT
5. SHAFT, WASHERS, NUT

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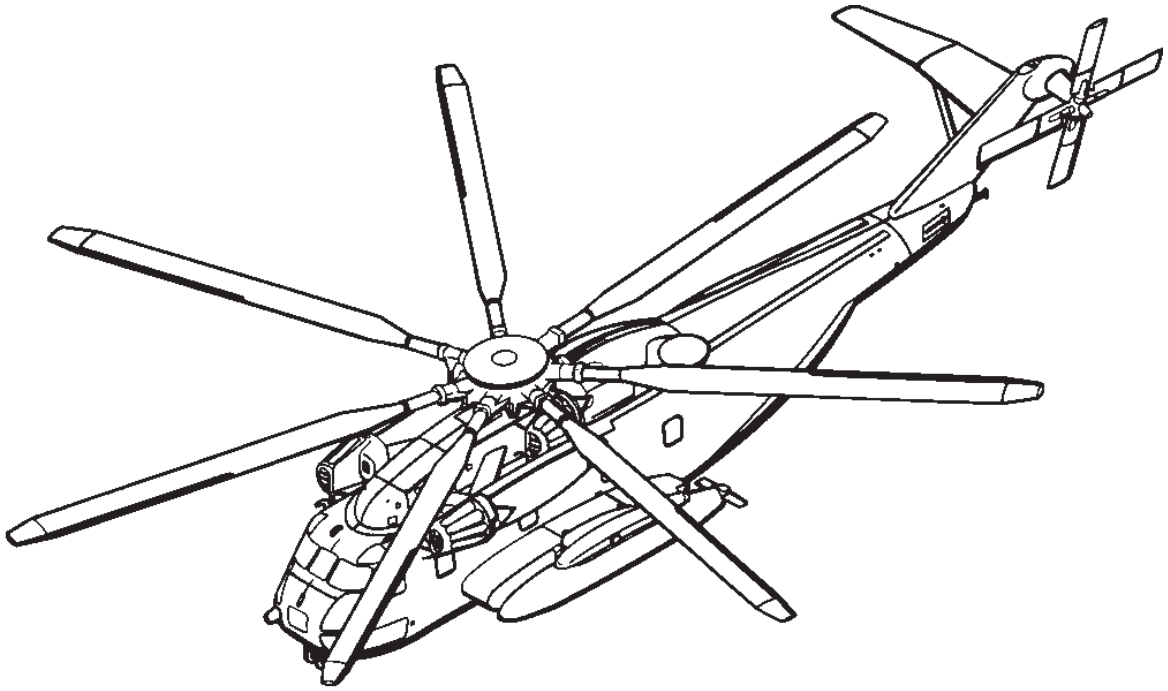
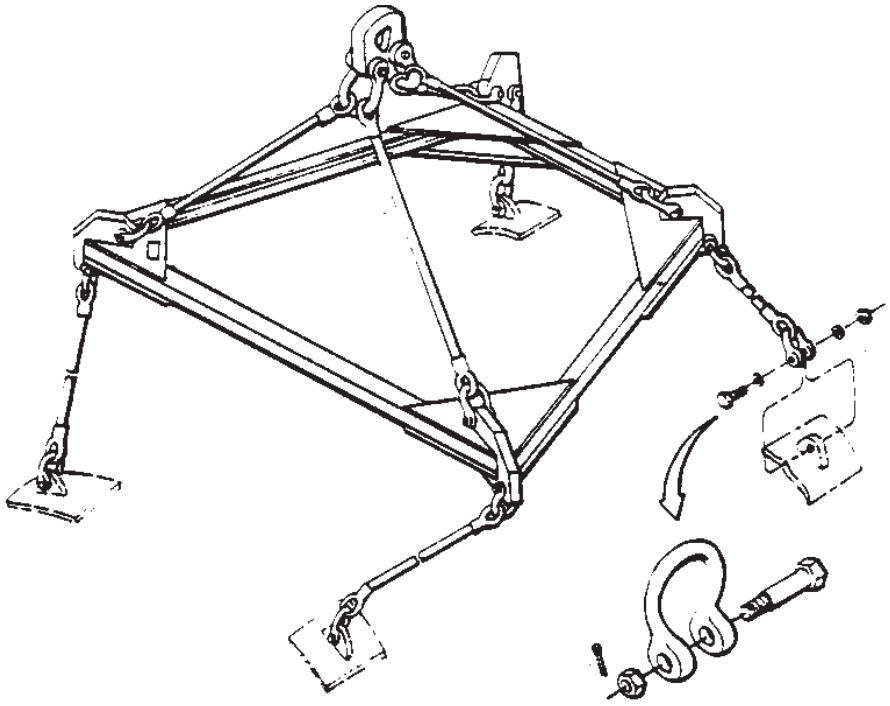
CH-53E Super Stallion (Navy)



DIMENSIONS	C/MH-53E
ROTOR DIAMETER	79 FT
LENGTH (OVERALL)	99 FT 1 IN
LENGTH (FUSELAGE)	73 FT 4 IN
LENGTH (BLADES AND PYLON FOLDED/PROBE REMOVED)	60 FT 6 IN
HEIGHT (MAST)	17 FT 2 IN
HEIGHT (TOP OF TAIL ROTOR)	28 FT 6 IN
HEIGHT (PYLON FOLDED)	18 FT 7 IN
WIDTH (MINIMUM, MH-53E)*	18 FT 6 IN
WEIGHTS (IN POUNDS)	
BASIC**	33,226 & 36,745
MAXIMUM TAKEOFF (INTERNAL/EXTERNAL)	69,750/73,500
MAXIMUM HOISTING	50,000
MAXIMUM JACKING	69,750
MAXIMUM TOWING	69,750

*WIDTH (WITH AUXILIARY TANKS) 23 FEET 11 INCHES
**WEIGHTS ARE FOR CH AND MH VERSIONS, RESPECTIVELY

CH-53E Super Stallion Helicopter Hoisting Sling



PART NUMBER 65720-70018-041

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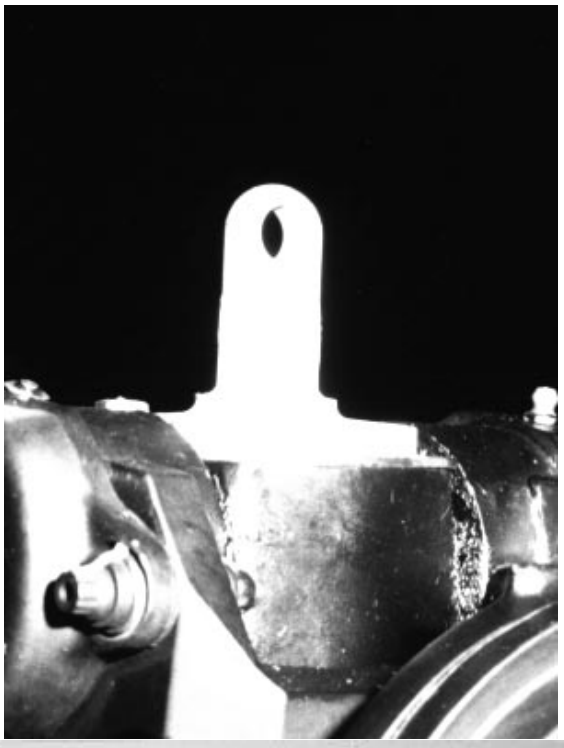
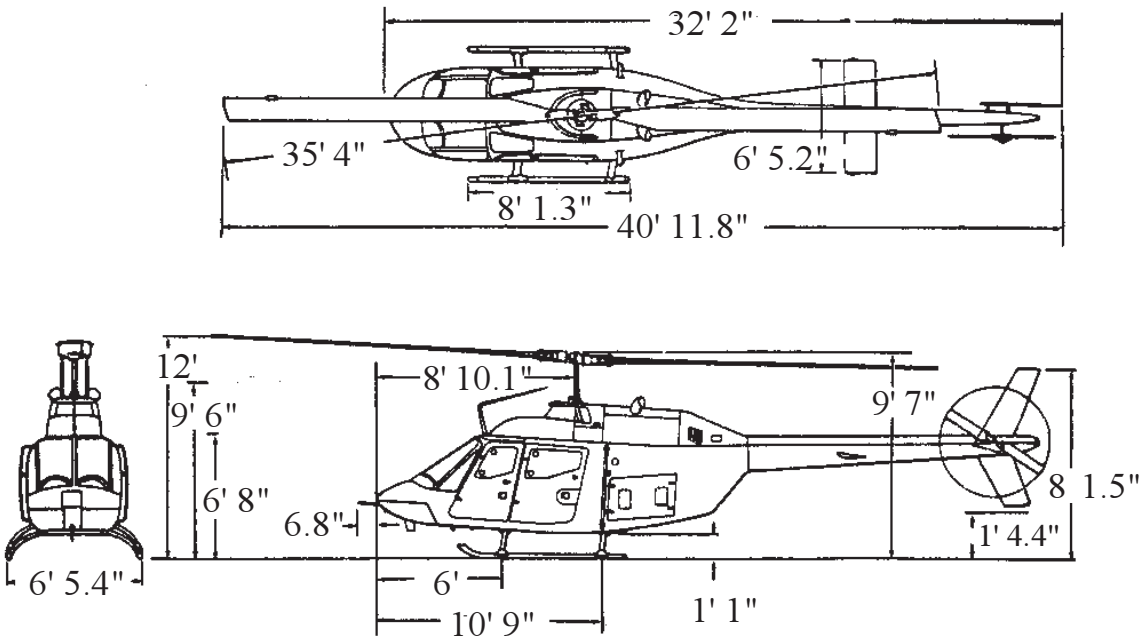
OH-58 Kiowa



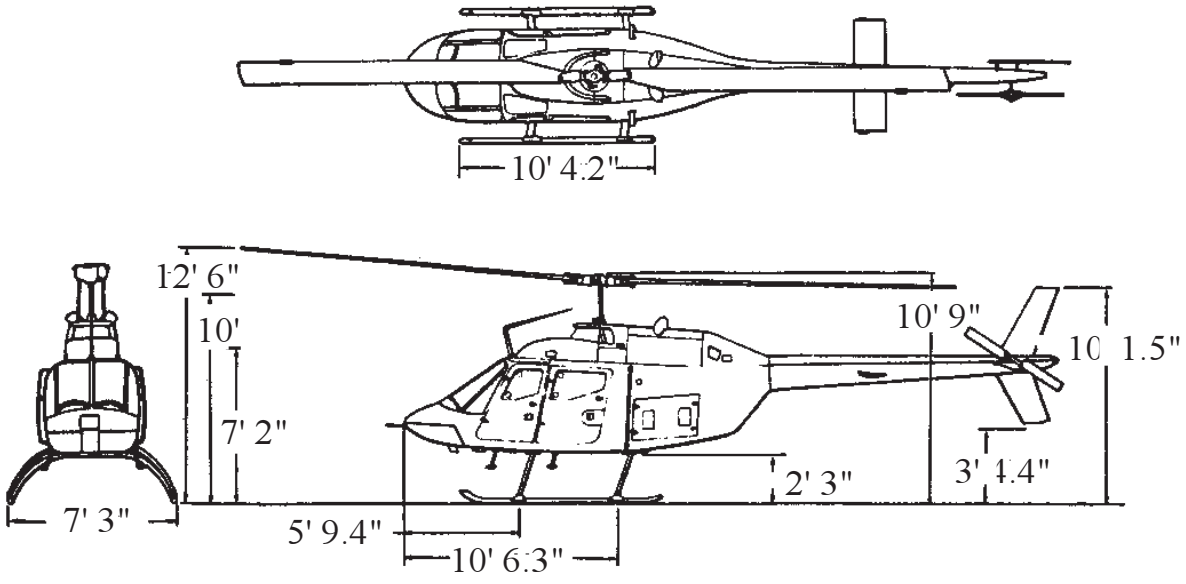
OH-58 A/C LIFTING EYE/MAST NUT

OH-58D KIOWA WARRIOR

OH-58 A/C Helicopter

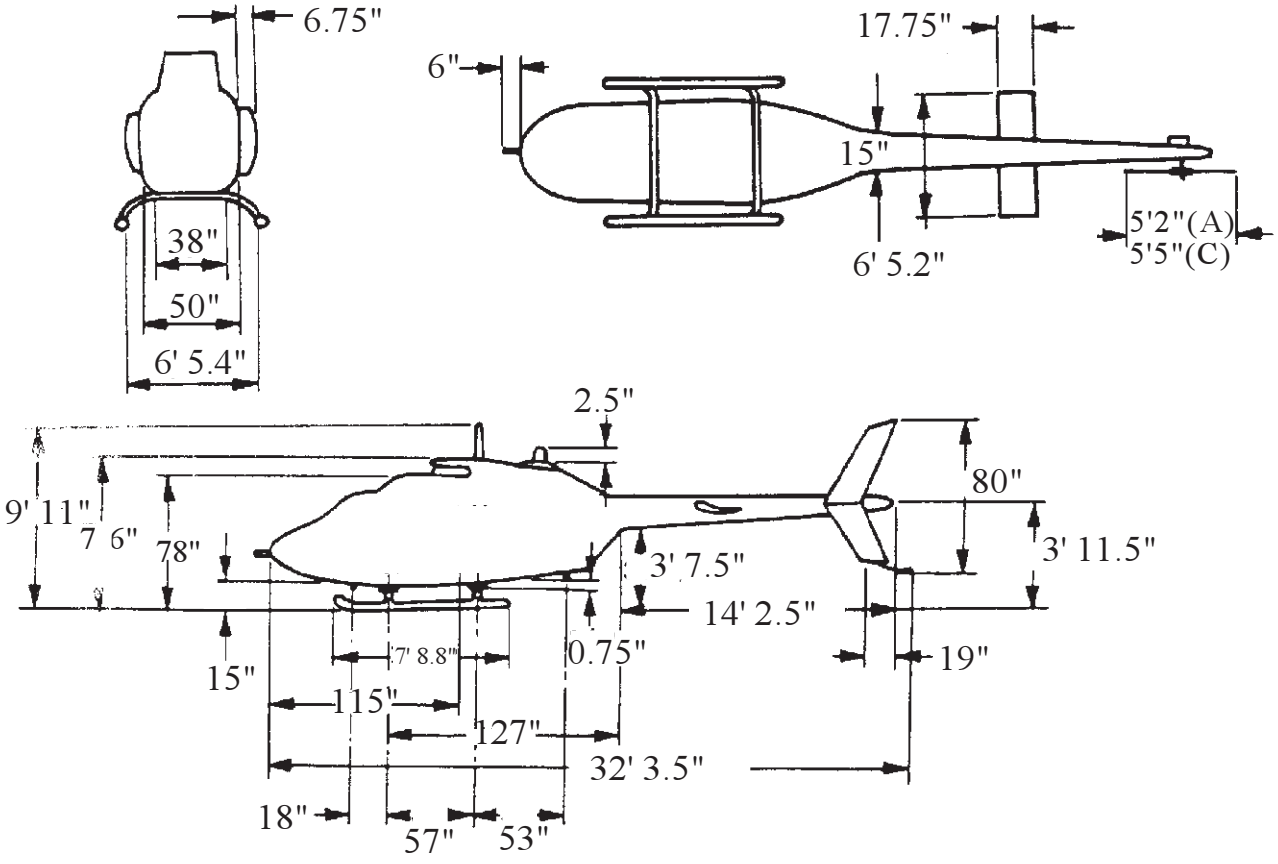


STANDARD SKID GEAR



HIGH SKID GEAR

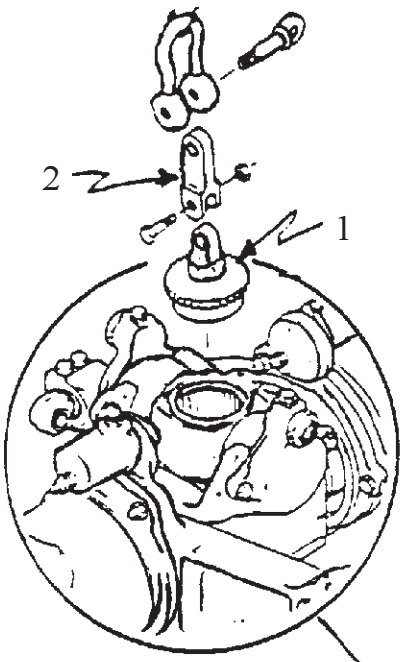
OH-58 A/C Helicopter



LOW SKID GEAR

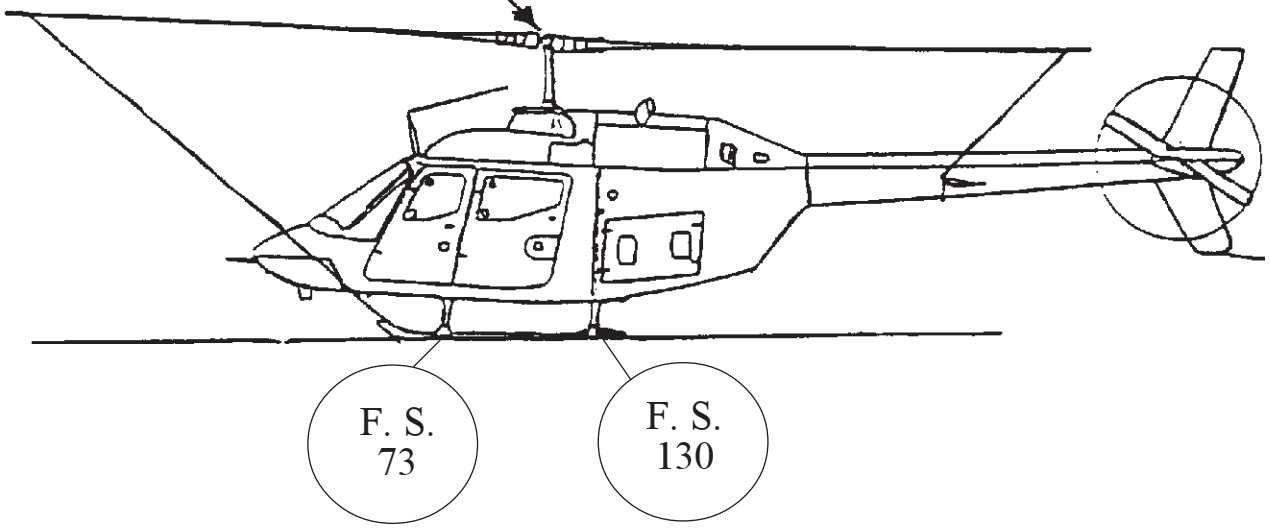
Hoisting Adapter for OH-58 A/C

SEE
DETAIL A

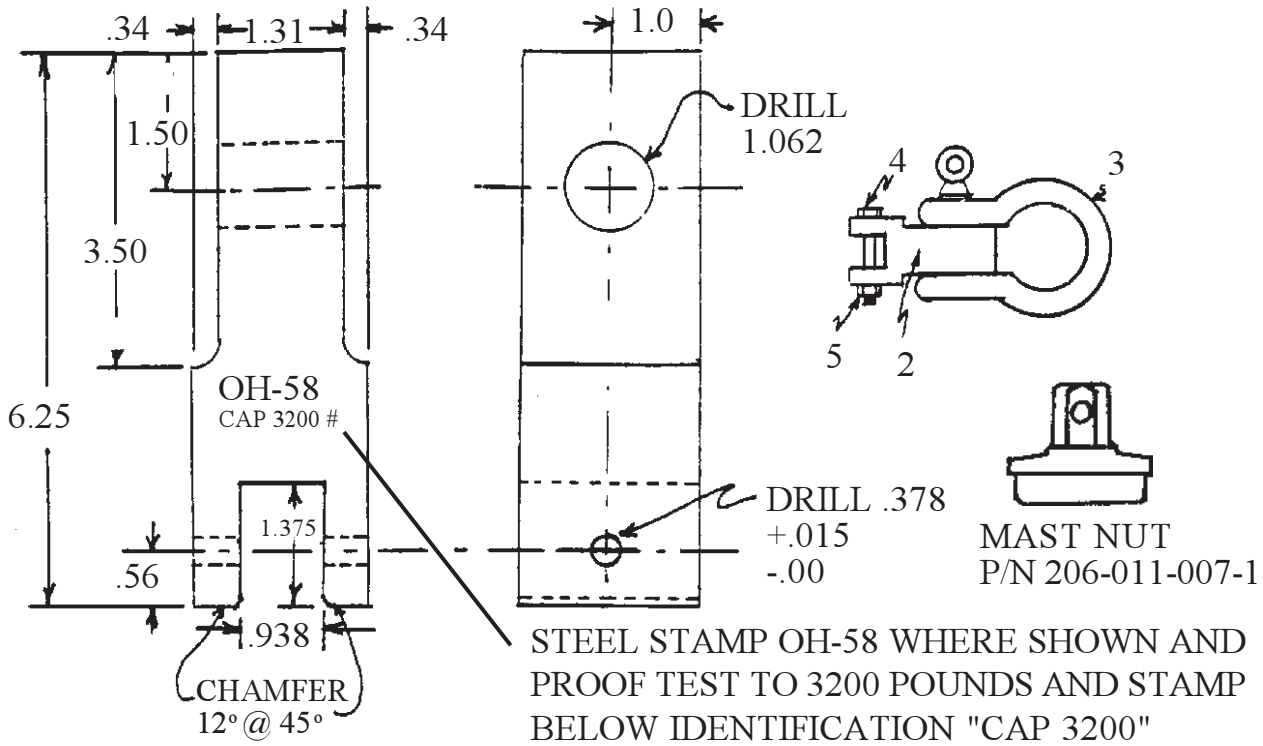


NOTES: 1. ENSURE THAT STRAP SIDE OF MAIN ROTOR TIEDOWN BOOT IS ON TOP SIDE OF BLADE AND DRAIN HOLE IS POSITIONED AT BOTTOM OF BLADE.
2. TWO DIFFERENT STYLES OF MAIN ROTOR RETAINING NUTS ARE IN USE. EACH STYLE REQUIRES A DIFFERENT ADAPTER.

1. MAST NUT (MAIN ROTOR RETAINING NUT)
2. HOISTNG ADAPTER (LOCAL MANUFACTURE) SEE DETAIL A



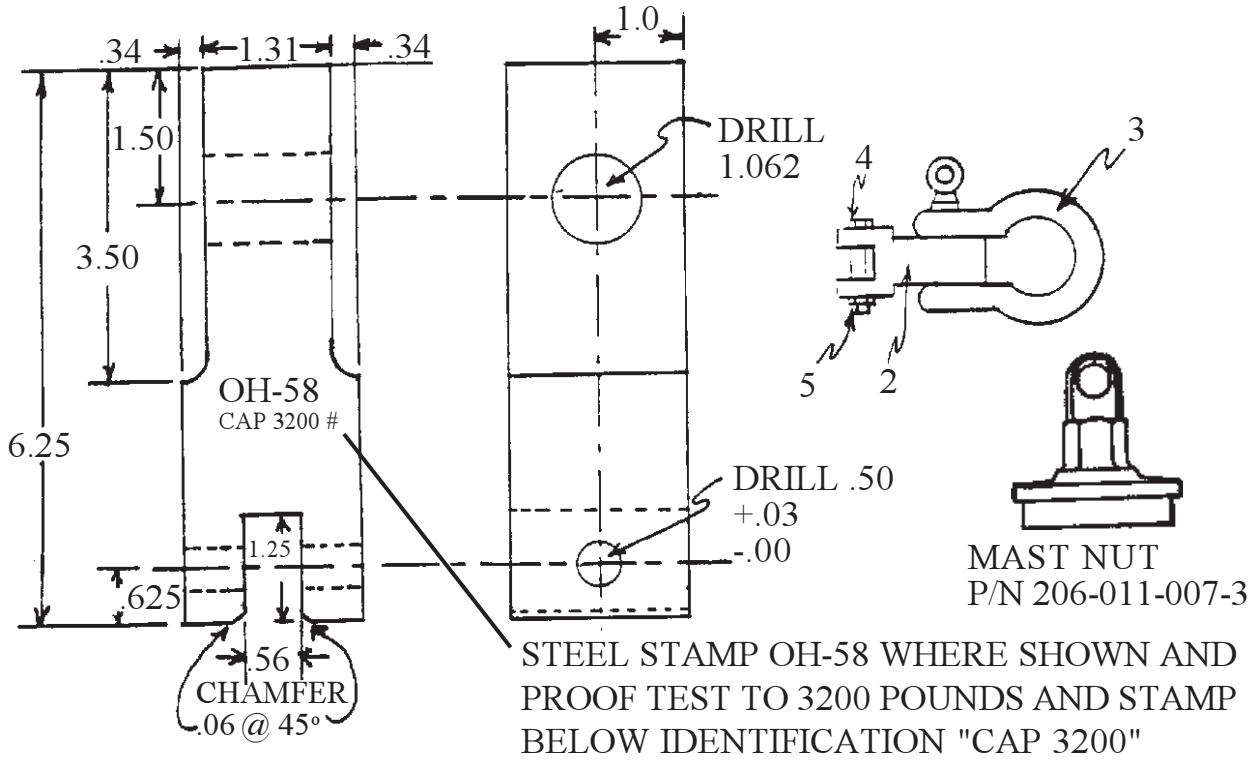
Detail A
OH-58A Hoisting Adapter for Main Rotor Retaining Mast Nut (P/N 206-011-007-1) (hexagon shaped lifting lug)



ITEM NO.	QTY REQ.	PART	DESCRIPTION	SPEC.	NOTES
1		ASSEMBLY, SHACKLE ADAPTER FOR OH-58			
2	1	ADAPTER	2" x 2" x 6-1/4"	M1020 STEEL	BAR STOCK
3	1	SHACKLE		AN116-14	OR EQUAL
4	1	BOLT CLOSE TOL.	3/8"-24UNF x 2-1/2"	NAS6206L32	OR EQUAL
5	1	NUT	3/8"-24UNF	AN315C6R	OR EOUAL

NOTES:
1. MAKE FROM 2" BAR STOCK M1020 MERCHANT QUALITY HOT ROLLED SQUARE (LOW CARBON) STEEL MATERIAL.
2. MILL 2 SIDES ONLY.
3. DRAWING NOT TO SCALE, ALL DIMENSIONS IN INCHES - TOLERANCE ±.031"
4. SEE TM 55-1500-338-S, PAGE 3-2, FIG 3-1 FOR MORE INFORMATION ON THIS ADAPTER.

Detail A
OH-58C Hoisting Adapter for Main Rotor Retaining Mast Nut (P/N 206-011-007-3) (flat lifting lug)

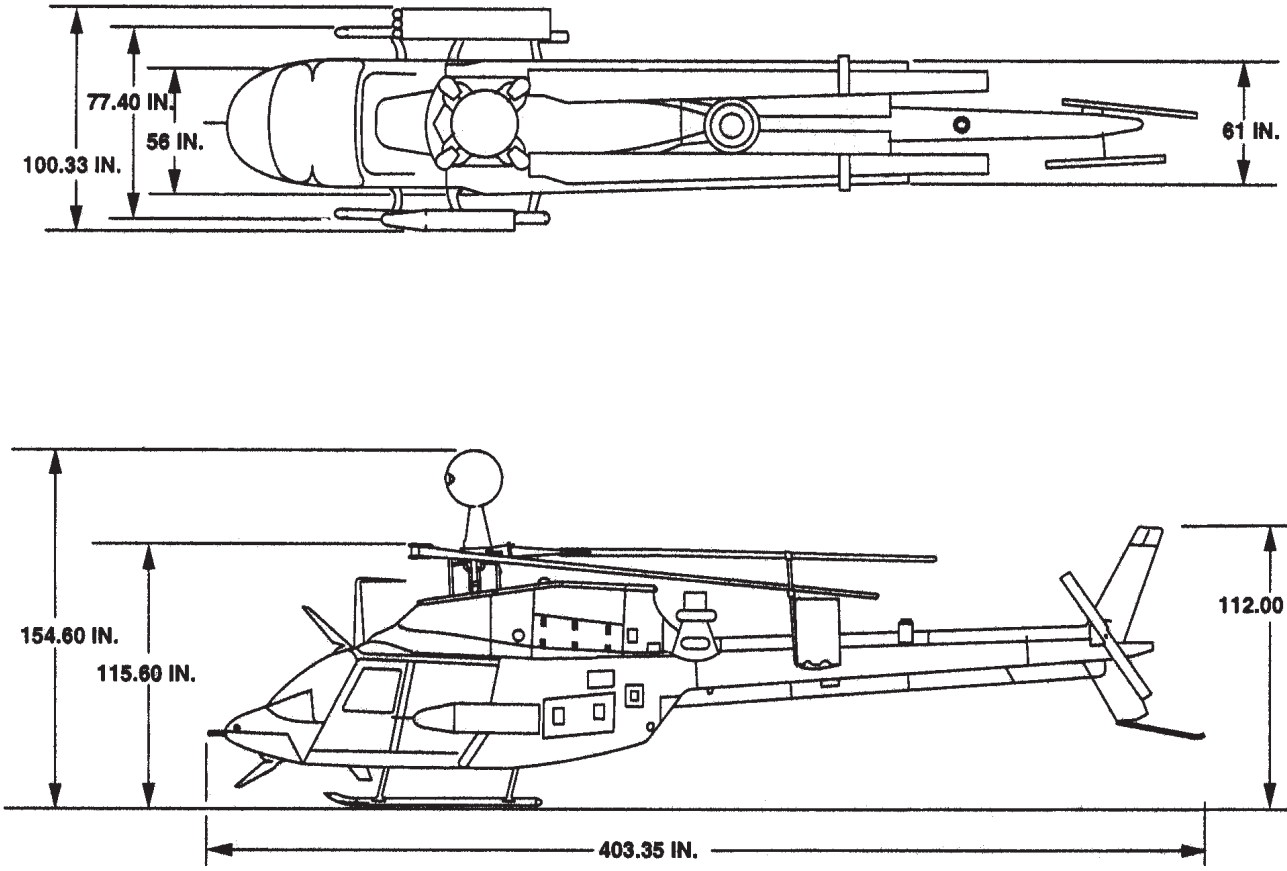


ITEM NO.	QTY REQ.	PART	DESCRIPTION	SPEC.	NOTES
1		ASSEMBLY, SHACKLE ADAPTER FOR OH-58			
2	1	ADAPTER	2" x 2" x 6-1/4"	M1020 STEEL	BAR STOCK
3	1	SHACKLE		AN116-14	OR EQUAL
4	1	BOLT CLOSE TOL.	1/2-20UNF x 2.6	NAS6209L32	OR EQUAL
5	1	NUT	1/2-20UNF	AN315C8R	OR EQUAL

NOTES:
1. MAKE FROM 2" BAR STOCK M1020 MERCHANT QUALITY HOT ROLLED SQUARE (LOW CARBON) STEEL MATERIAL.
2. MILL 2 SIDES ONLY.
3. DRAWING NOT TO SCALE, ALL DIMENSIONS IN INCHES - TOLERANCE ± .031"
4. IN LIEU OF THIS ADAPTER, USE THE CLEVIS USED FOR LIFTING THE UH-1 (P/N 204-011-178-1).

OH-58D Kiowa Warrior

OH-58D Shipping Dimensions



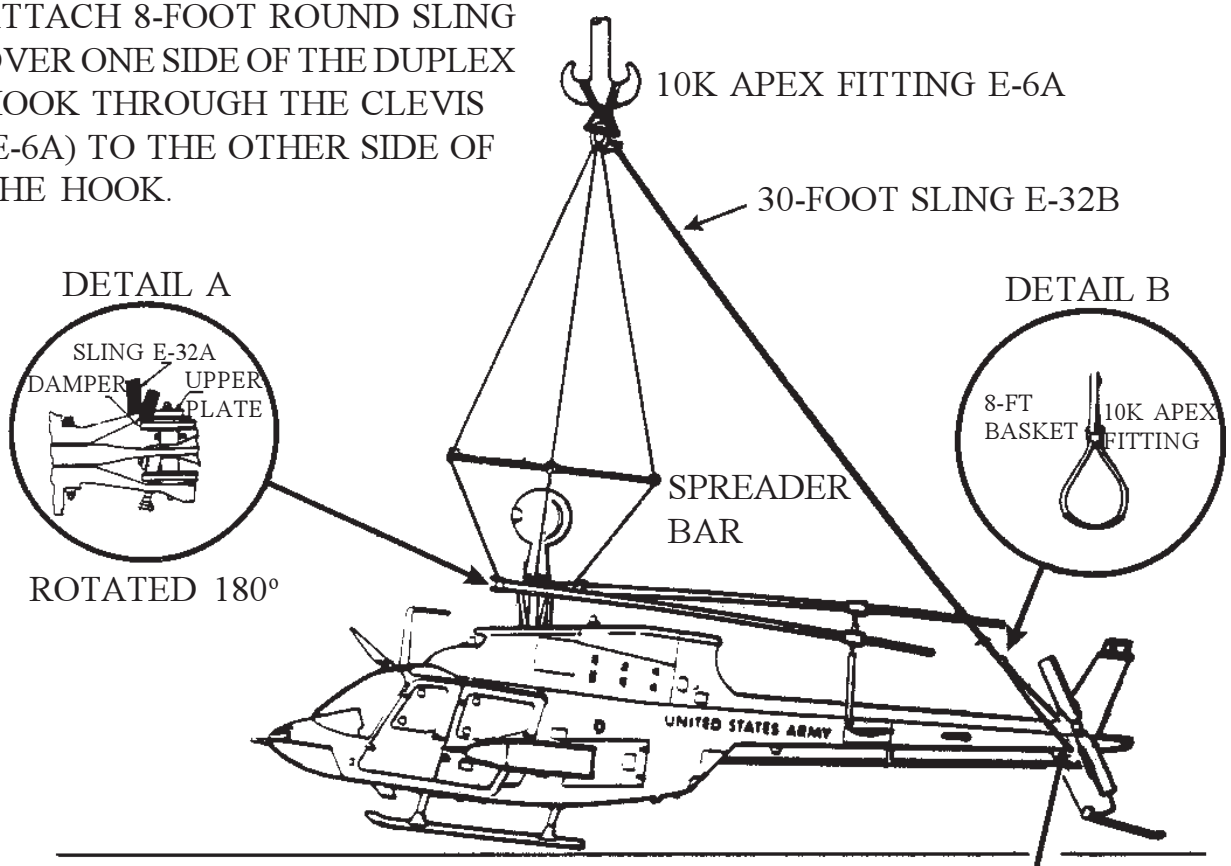
HELICOPTER ON STANDARD LANDING GEAR.
MAIN ROTOR BLADES FOLDED.
UNIVERSAL WEAPONS PYLONS FOLDED.
HORIZONTAL STABILIZER FOLDED.
IF NEEDED, REMOVE MAST MOUNTED SIGHT TO REDUCE HEIGHT.

OH-58D Sling Assembly

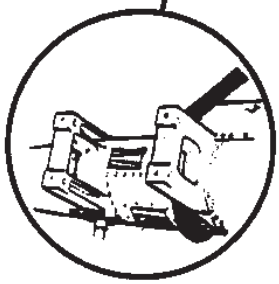
CAUTION

TO PREVENT DAMAGE TO THE MAST-MOUNTED SIGHT AND THE HELICOPTER HAVE GROUND CREWMEMBER HOLD THE SPREADER BAR OFF THE TOP OF THE MAST-MOUNTED SIGHT BEFORE DISCONNECTING THE SLING LINK.

NOTE:
ATTACH 8-FOOT ROUND SLING OVER ONE SIDE OF THE DUPLEX HOOK THROUGH THE CLEVIS (E-6A) TO THE OTHER SIDE OF THE HOOK.

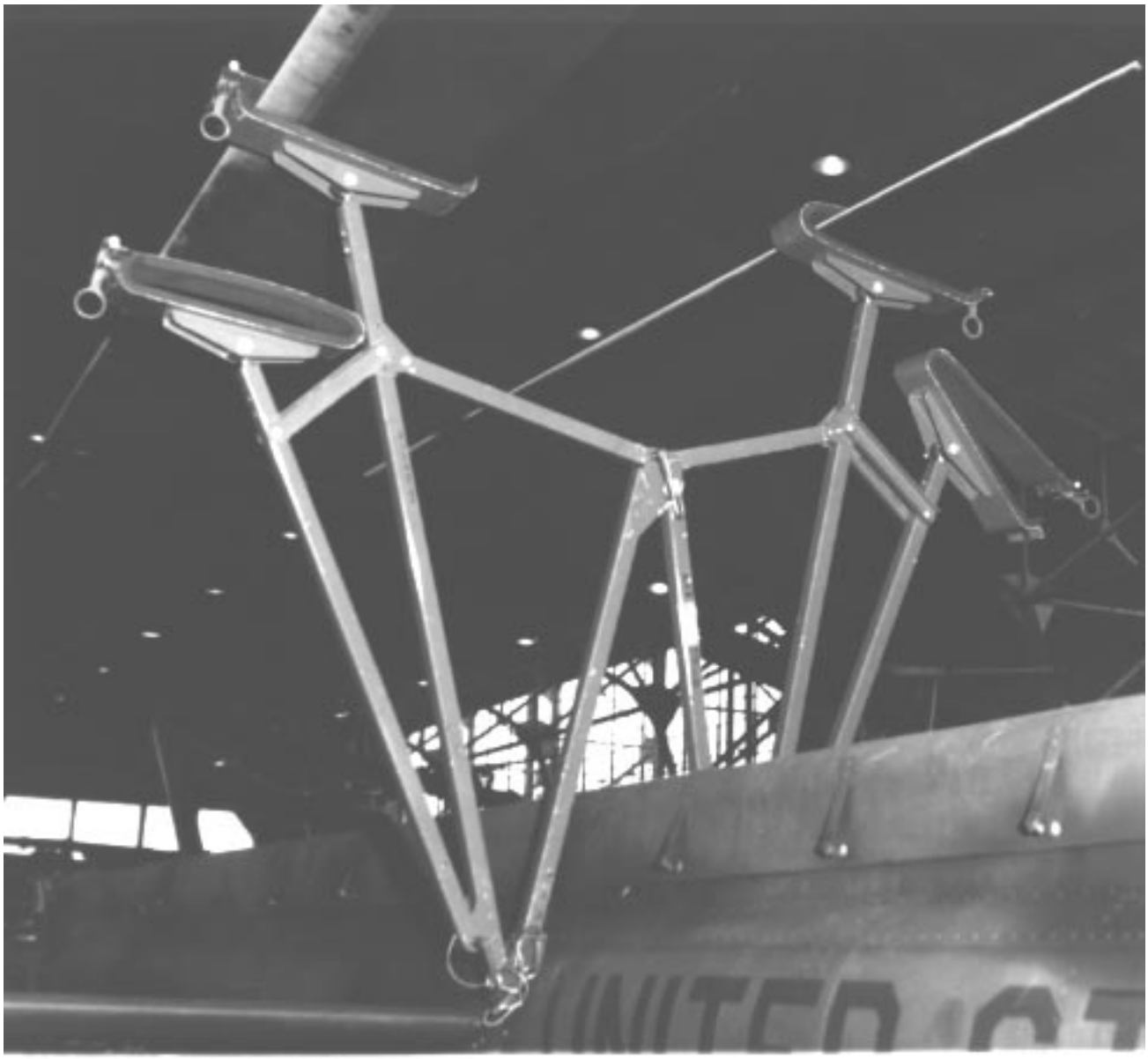


NOTES:
1. WITH OR WITHOUT SIGHT.
2. FOR OH-58D(I), UNIVERSAL WEAPONS MUST BE FOLDED.
3. DETAIL C IS SHOWN WITH VERTICAL STABILIZER REMOVED. REMOVAL OF VERTICAL STABILIZER IS NOT REQUIRED.



DETAIL C
ROTATED 180°

OH-58D Blade Folding Bracket



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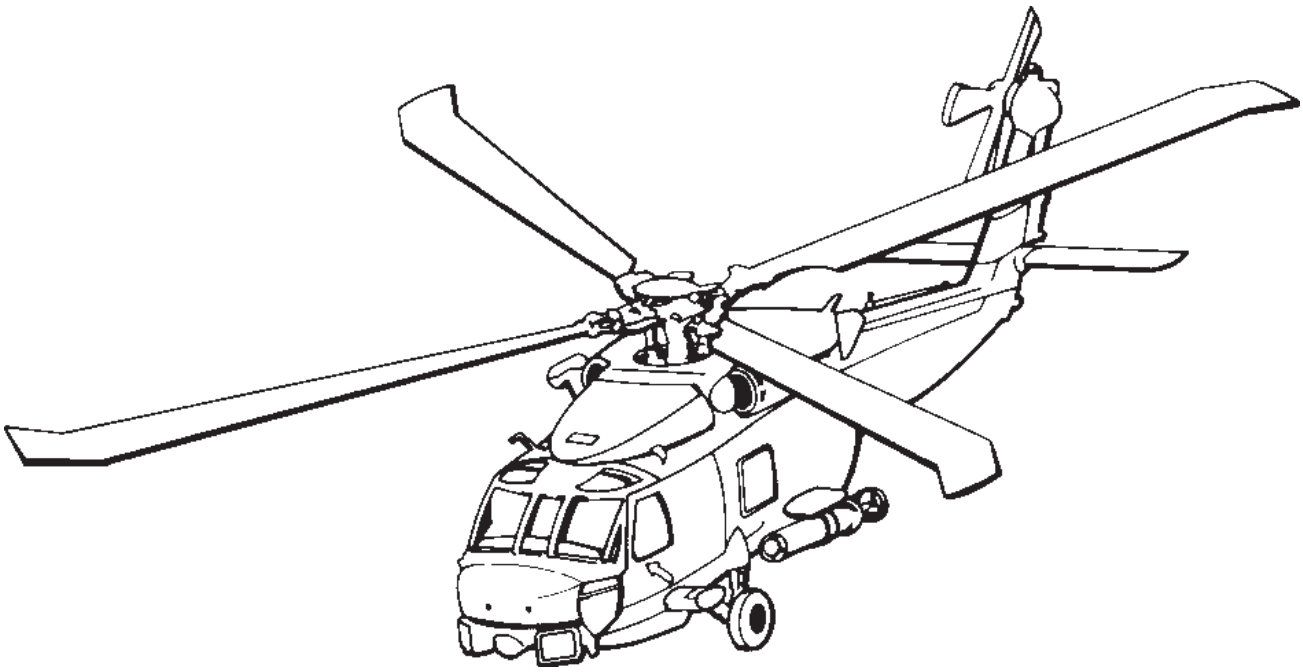
HH-60J (Navy)



DIMENSIONS*	HH-60J
ROTOR DIAMETER	53 FT 8 IN
LENGTH (OVERALL)	64 FT 10 IN
LENGTH (FOLDED)	40 FT 11 IN
HEIGHT (OPERATING)	17 FT
HEIGHT (FOLDED)	13 FT 3 IN
WIDTH (FOLDED)	10 FT 8.5 IN

*FOR DRAWING WITH DIMENSIONS, SEE PAGES A-47 AND A-48

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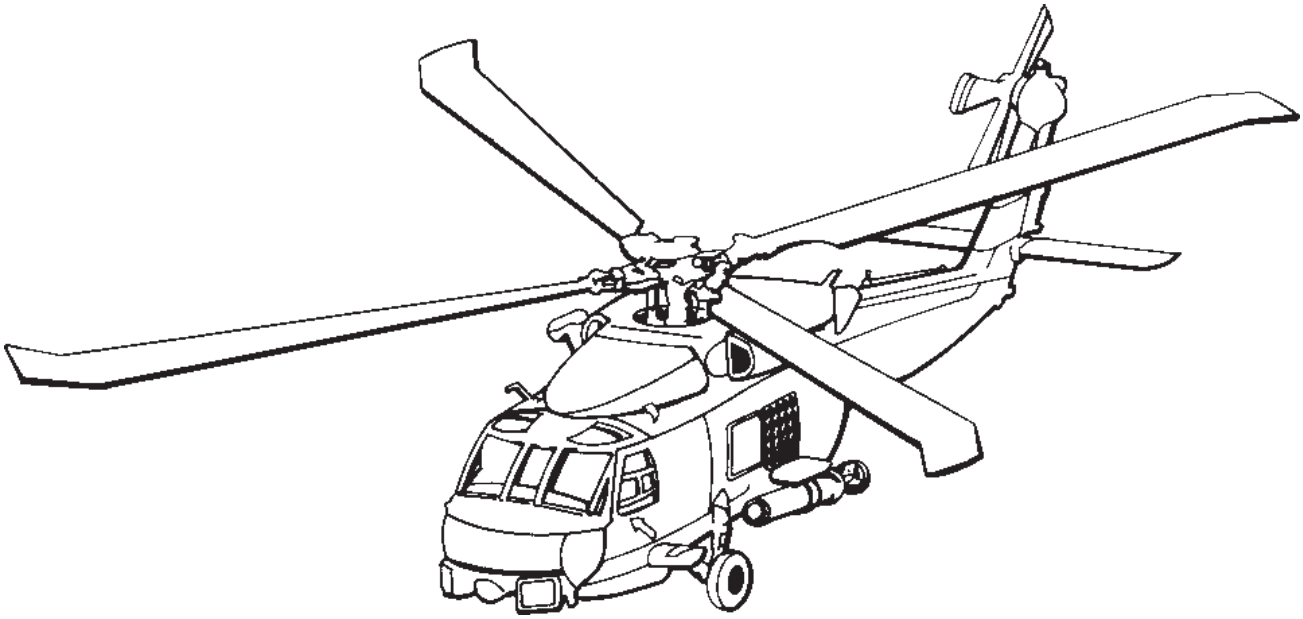
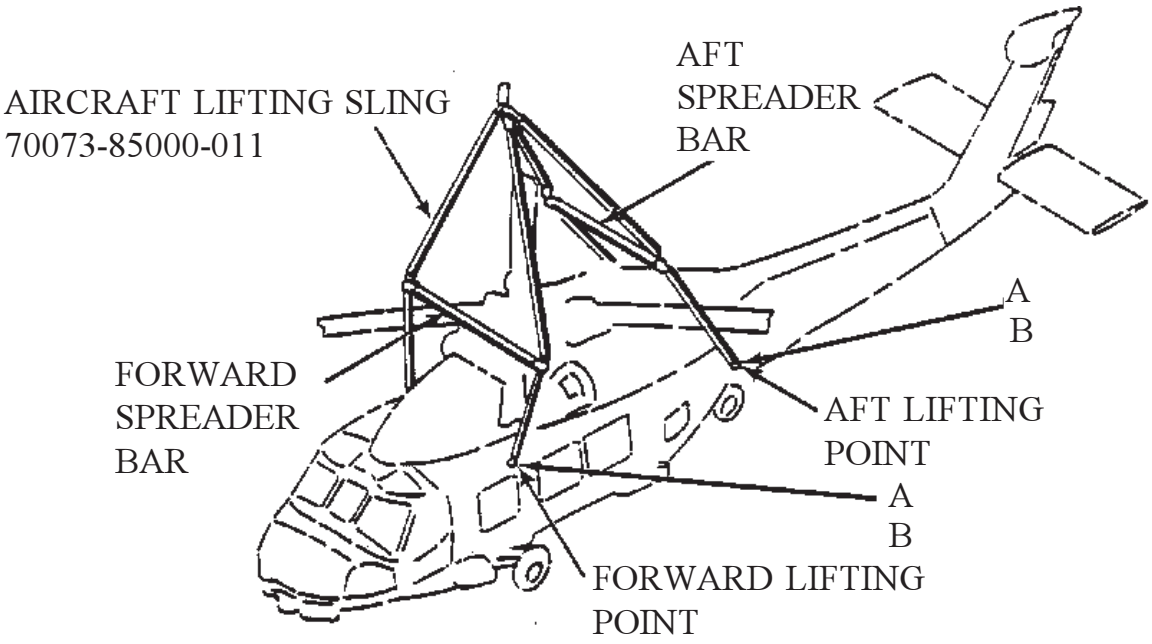
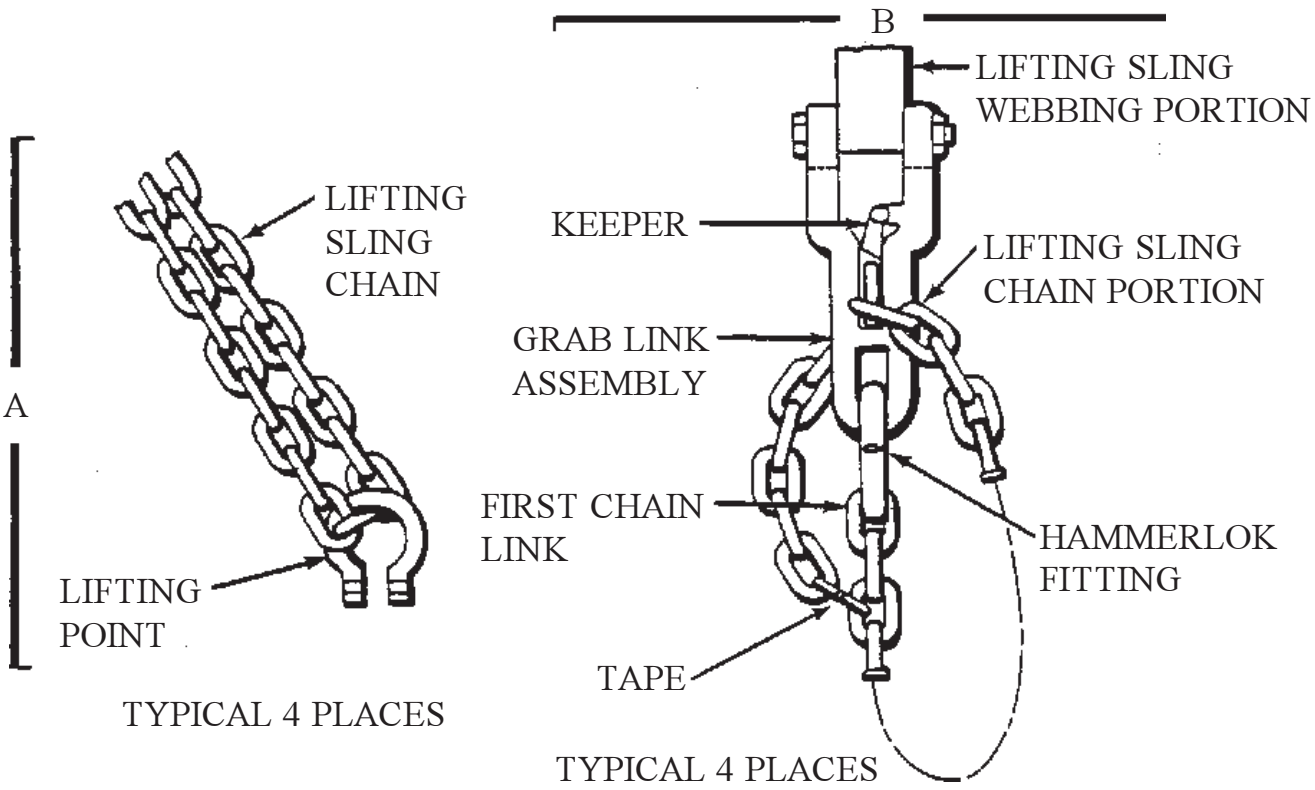
SH-60B Seahawk (Navy)



DIMENSIONS	SH-60B
ROTOR DIAMETER	53 FT 8 IN
LENGTH (OVERALL)	64 FT 10 IN
LENGTH (FUSELAGE)	50 FT
LENGTH (BLADES AND PYLON FOLDED)	40 FT 11 IN
HEIGHT (MAST)	12 FT 6 IN
HEIGHT (TOP OF TAIL ROTOR)	17 FT
HEIGHT (FOLDED)	13 FT 3 IN
WIDTH (W/HORIZONTAL STABILIZER)	14 FT 4 IN
WIDTH (MINIMUM)	10 FT 7 IN
WEIGHTS (IN POUNDS)	
BASIC	14,193
MAXIMUM TAKEOFF (INTERNAL)	20,800
MAXIMUM TAKEOFF (EXTERNAL)	21,700
MAXIMUM LANDING	21,700
MAXIMUM HOISTING	21,700
MAXIMUM JACKING	21,700
MAXIMUM TOWING	21,700

HH-60J and SH-60B Helicopter Hoist





HH-60J and SH-60B Hoisting Configurations

HELICOPTER CONFIGURATION	SLING ADJUSTMENT (LINKS)		CENTER OF GRAVITY
(SEE BELOW)	FORWARD	AFT	
A1, A2	34	80	364 INCHES
B1, B2	31	84	358 INCHES
C1, C2, C3, C4	29	88	351 INCHES
D1, D2	27	92	345 INCHES
E1, E2	24	100	333 INCHES

A1 MAIN ROTOR BLADES SPREAD
TAIL PYLON SPREAD
FUEL CELLS FULL

A2 MAIN ROTOR BLADES REMOVED
TAIL PYLON SPREAD
FUEL CELLS FULL

B1 MAIN ROTOR BLADES SPREAD
TAIL PYLON FOLDED
FUEL CELLS FULL

B2 MAIN ROTOR BLADES REMOVED
TAIL PYLON FOLDED
FUEL CELLS FULL

C1 MAIN ROTOR BLADES SPREAD
TAIL PYLON REMOVED
FUEL CELLS FULL

C2 MAIN ROTOR BLADES REMOVED
TAIL PYLON REMOVED
FUEL CELLS FULL

C3 MAIN ROTOR BLADES SPREAD
TAIL PYLON SPREAD
FUEL CELLS EMPTY

C4 MAIN ROTOR BLADES REMOVED
TAIL PYLON SPREAD
FUEL CELLS EMPTY

D1 MAIN ROTOR BLADES SPREAD
TAIL PYLON FOLDED
FUEL CELLS EMPTY

D2 MAIN ROTOR BLADES REMOVED
TAIL PYLON FOLDED
FUEL CELLS EMPTY

E1 MAIN ROTOR BLADES SPREAD
TAIL PYLON REMOVED
FUEL CELLS EMPTY

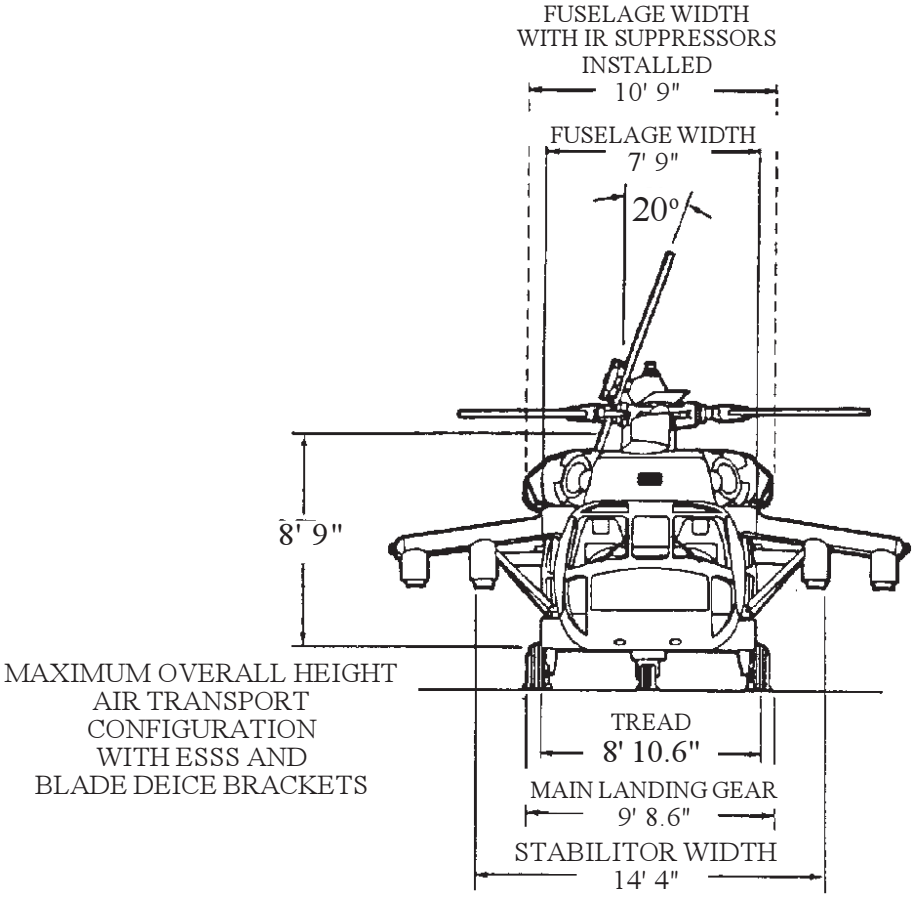
E2 MAIN ROTOR BLADES REMOVED
TAIL PYLON REMOVED
FUEL CELLS EMPTY

Go to Contents

UH-60 Black Hawk

UH-60 AFT LIFTING/
TIEDOWN POINT

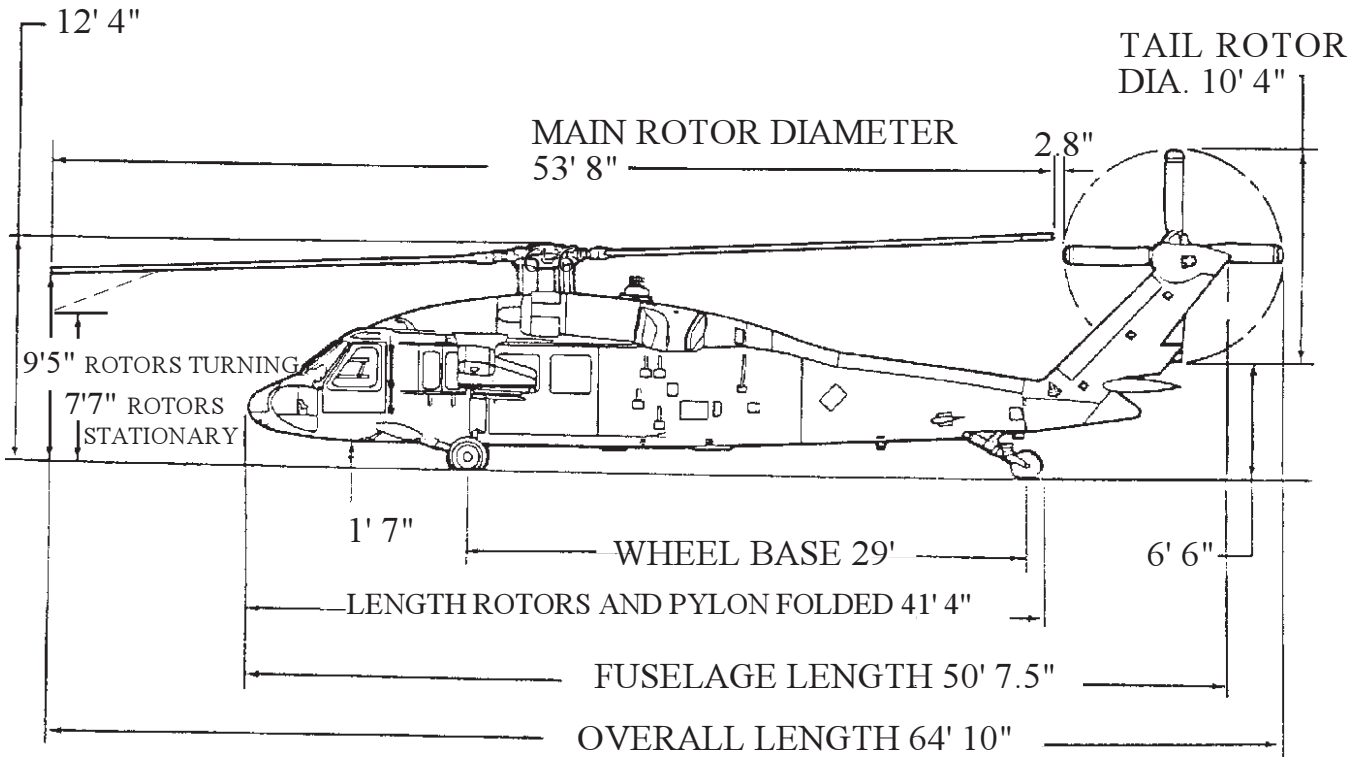
Dimensions of UH-60 Helicopter



NOMENCLATURE	DIMENSIONS (IN.)			SHIPPING WEIGHT (LB)
	LENGTH	WIDTH	HEIGHT	
UH-60 A MODEL	600.75[1]	129[2]	148[3]	17,000
SH-60	608[1]	129[2]	148[3]	15,550
VH-60	608[1]	129[2]	148[3]	17,150
HH-60	608[1]	129[2]	148[3]	15,550

[1] LENGTH IS 496 INCHES WITH ROTORS & PYLON FOLDED.
[2] WIDTH WITH IR SUPPRESSORS REMOVED IS 117 INCHES.
[3] MAXIMUM OVERALL HEIGHT IS 105 INCHES FOR AIR TRANSPORT.

Dimensions of UH-60 Helicopter

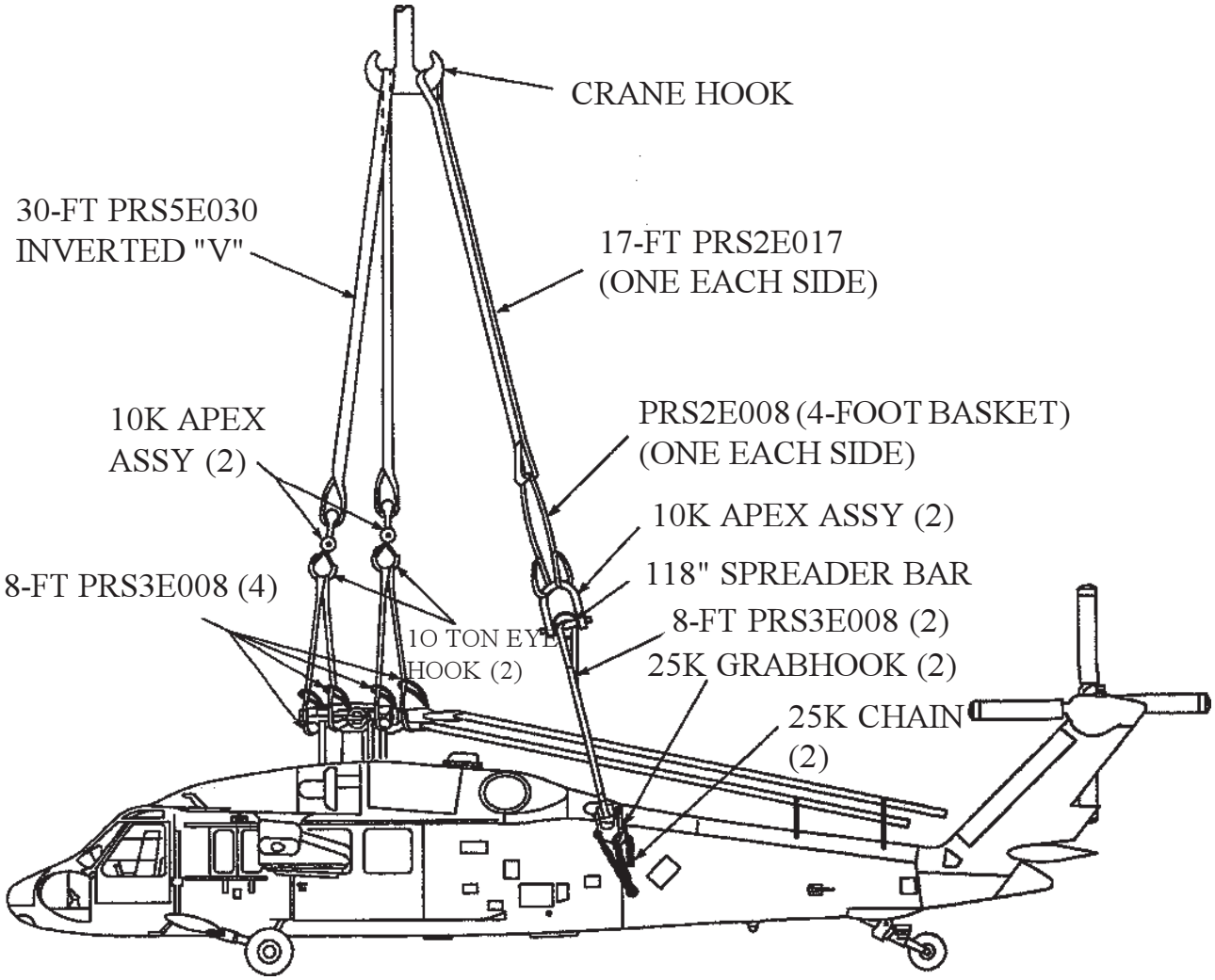


NOTE: FOLDING THE TAIL PYLON AND REMOVING THE STABILITOR MAY BE REQUIRED FOR SUFFICIENT HELICOPTER SPACING.

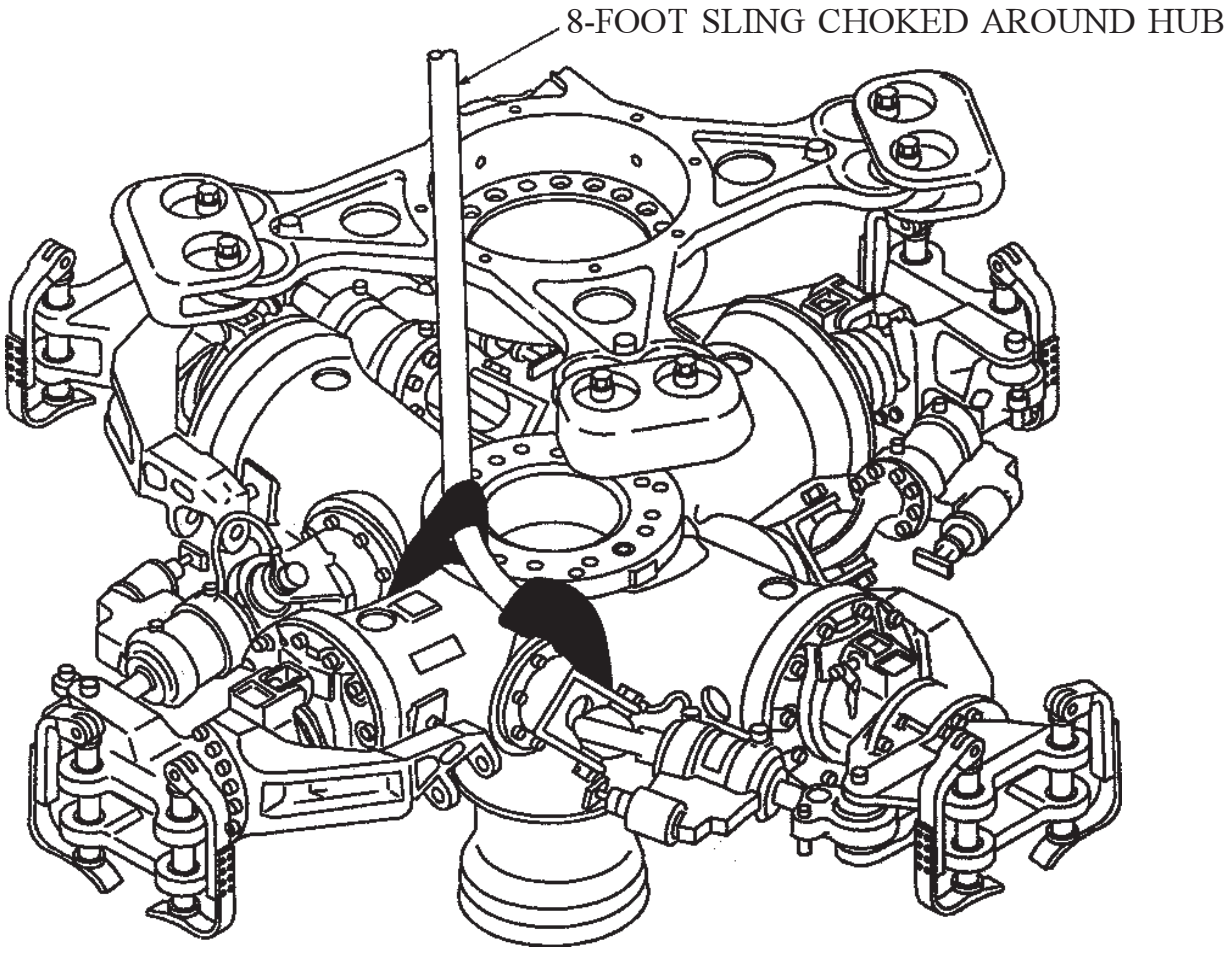
UH-60/EH-60/MH-60K HELICOPTER HOISTING EQUIPMENT

*NOMENCLATURE	PART NUMBER	NSN	ROTOR HEAD LIFT	FWD LIFTING RING/ ADAPTER
Round sling, 5,300 lb, 8-ft	PRS2E008	1670-01-388-6789	4	4
Round sling, 8,400 lb, 8-ft	PRS3E008	1670-01-388-8480	4	
Round sling, 5,300 lb, 17-ft	PRS2E017	1670-01-388-3845	2	
Round sling, 8,400 lb, 17-ft	PRS3E017	1670-01-388-8479		2
Round sling, 13,200 lb 30-ft	PRS5E030	1670-01-388-3917	1	
Apex, 10K Cargo Sling	38850-00004-045	4030-01-048-4045	4	2
Pin, Quick Release (optional)	MS17984C612	5315-00-058-1703	2	
Eye Hook (optional)	S-320A-11	4030-01-156-8832	2	
Grabhook, 25K Sling	38850-00011-046	4030-01-048-4047	2	4
Chain, 25K Cargo Sling	38850-00053-102	4030-01-058-4771	2	4
Spreader Bar	1670-EG-141	Local Manufacture	1	1
*Components of Helicopter Recovery Kit, P/N 1670-EG-140, NSN 1670-01-431-4426				

UH-60/EH-60/MH-60K Helicopter Rigged for Lifting

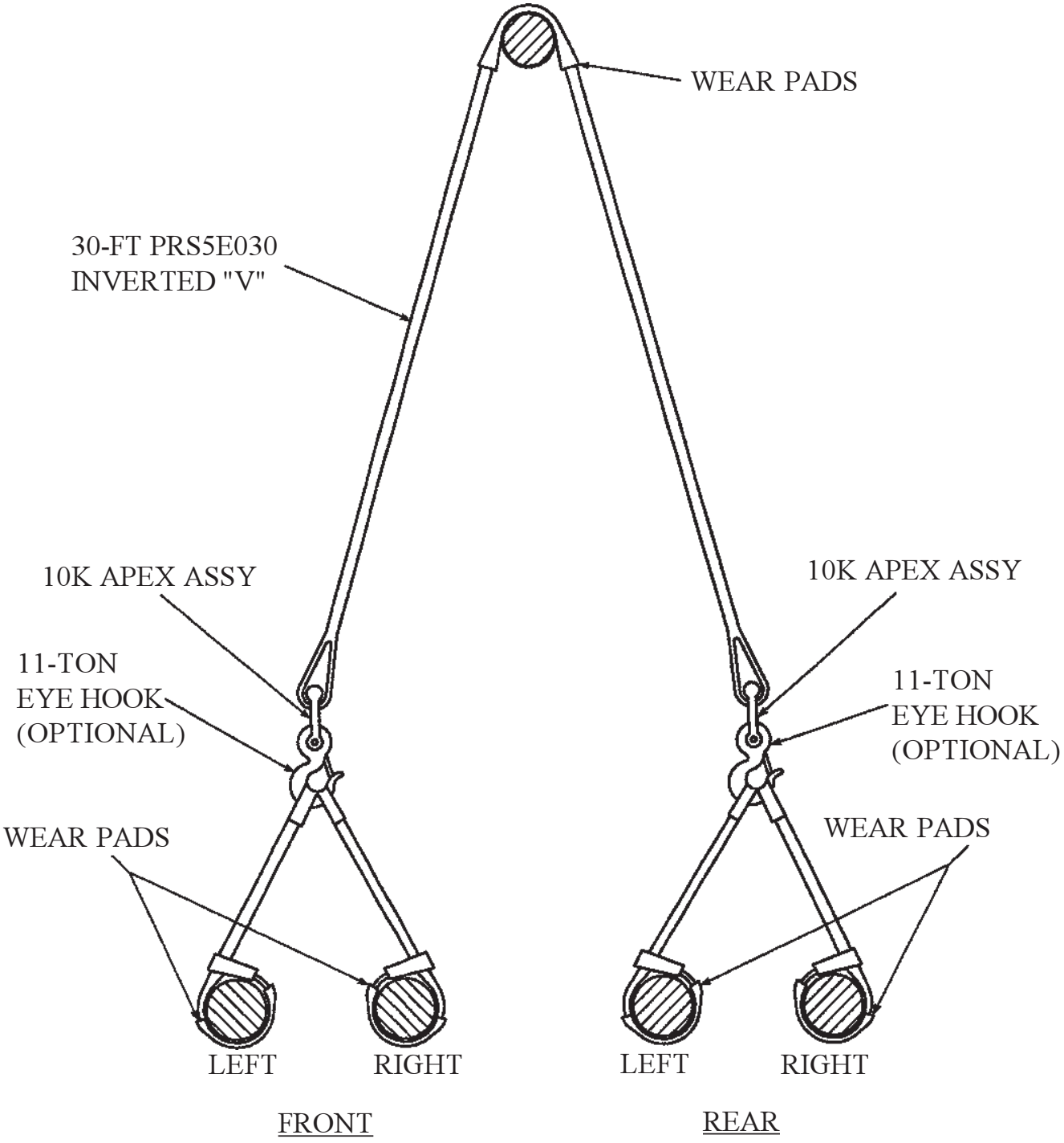


UH-60/EH-60/MH-60K Rotor Head Rigging Showing Position of One 8-Foot Round Sling

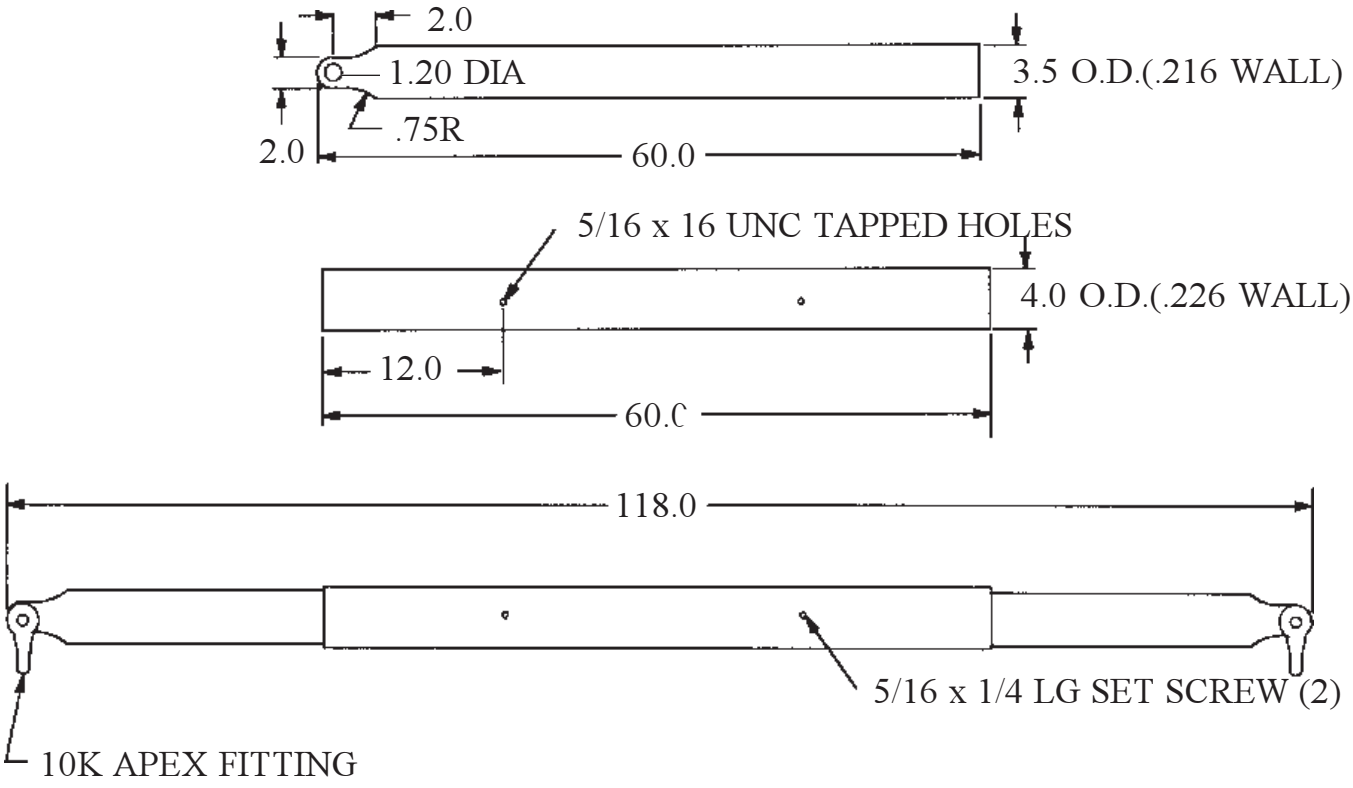


UH-60 ROTOR HUB ASSEMBLY

Rotor Hub Sling Assembly



UH-60 Lifting Spreader Bar



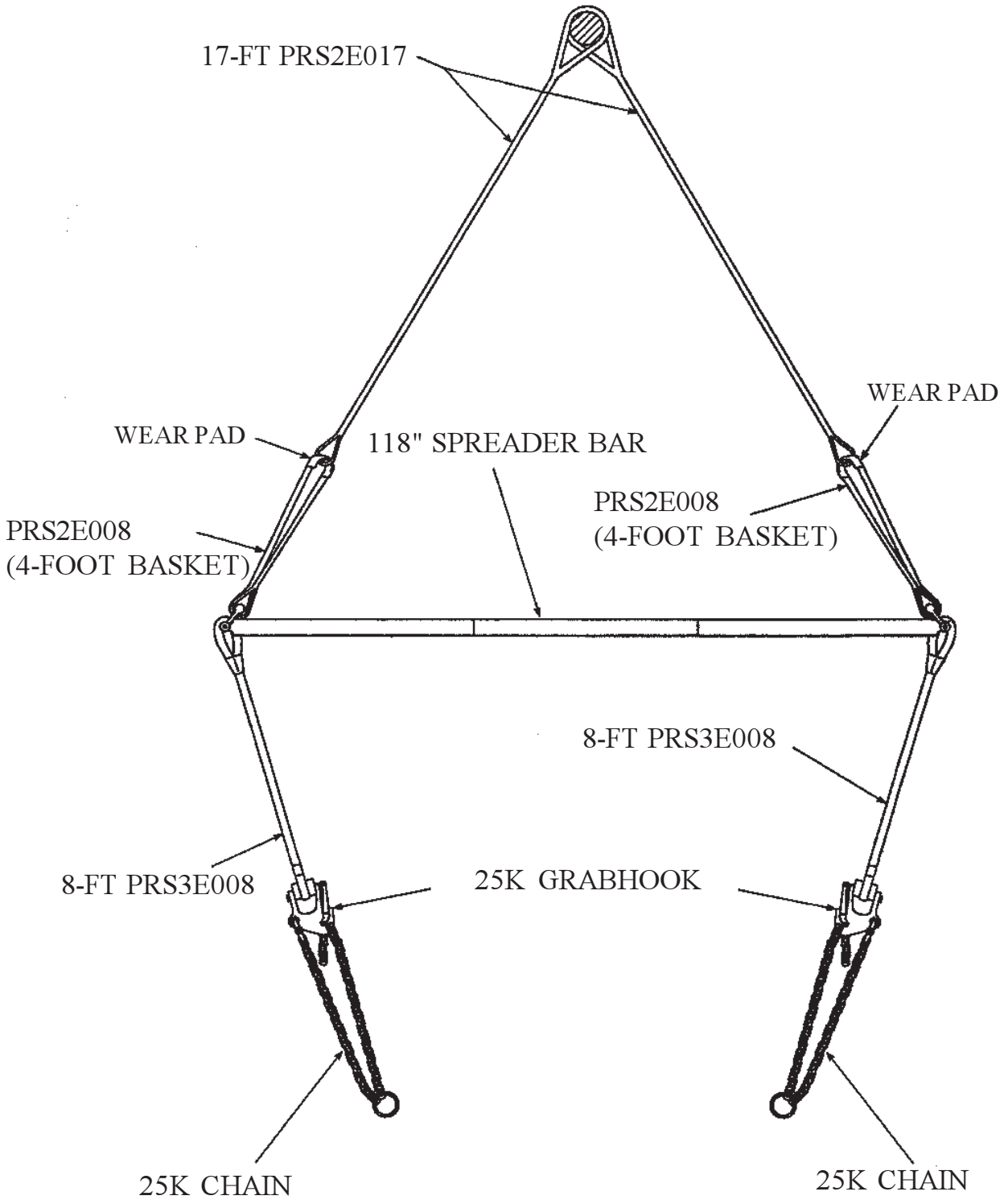
SCHEDULE 40 ALUMINUM PIPE 6061T6

WEIGHT WITHOUT APEX FITTING IS 29 LB

WEIGHT COMPLETE IS 38 LB

NOTE: ALL DIMENSIONS ARE IN INCHES.

Aft Lifting Sling Configuration



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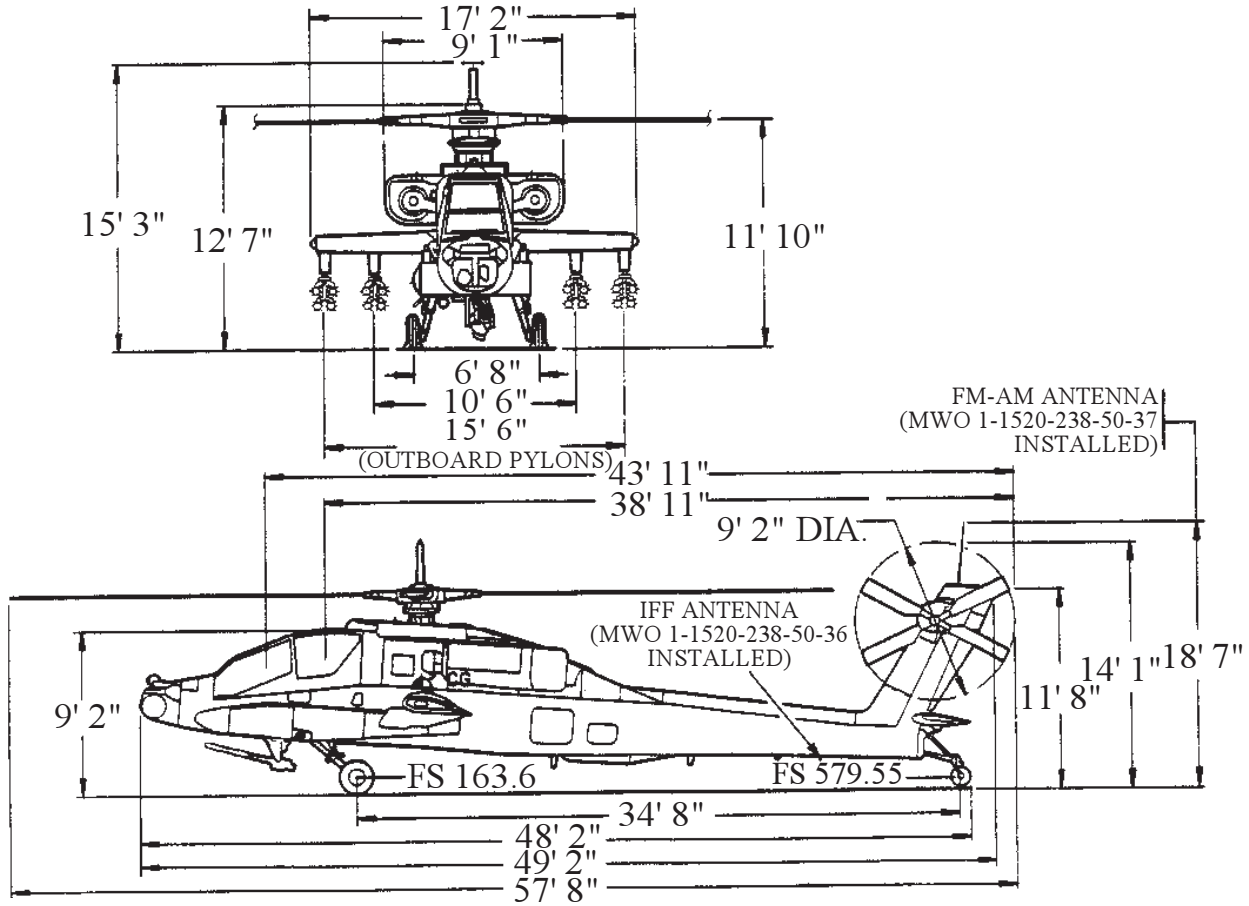
AH-64 Apache

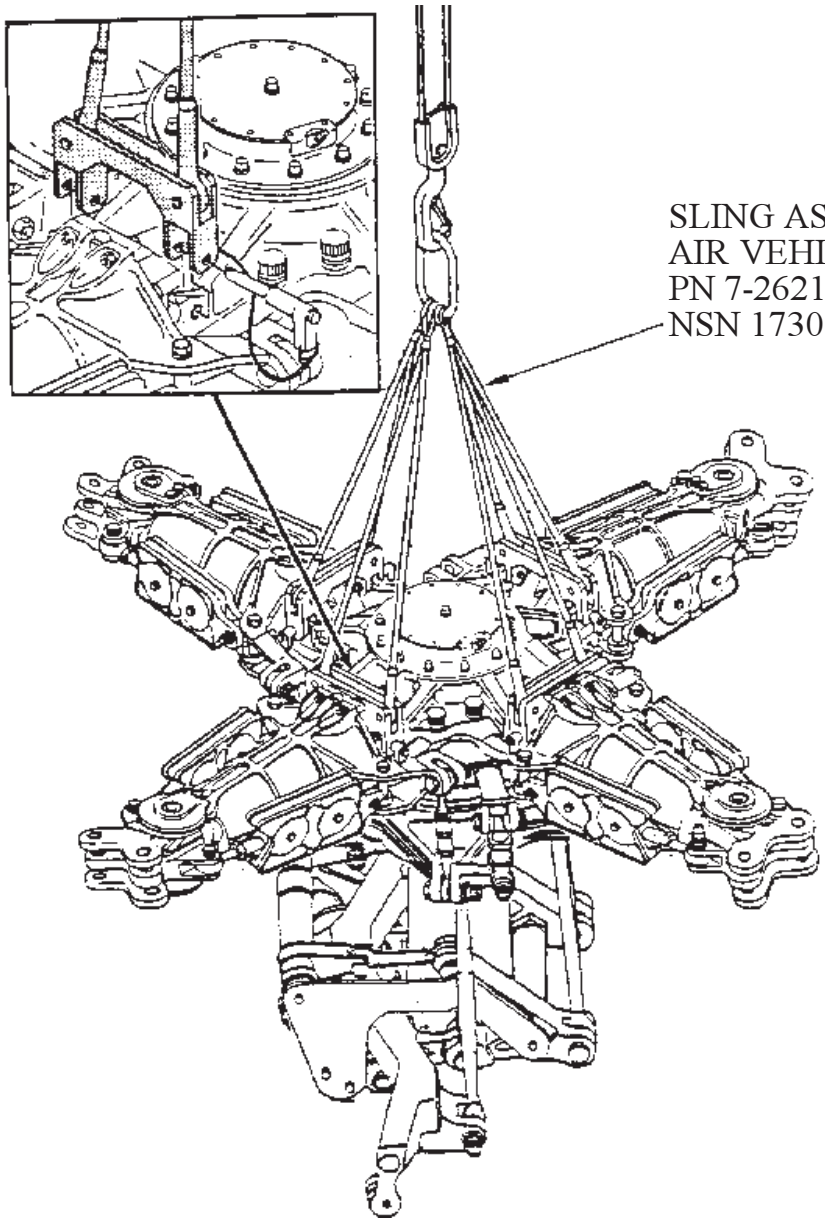
AH-64A Helicopter



NOMENCLATURE	DIMENSIONS (IN.)			SHIPPING WEIGHT (LB)
	LENGTH	WIDTH	HEIGHT	
AH-64A w/ Main Rotor blades	692	109[1]	209[2]	13,268[3]
AH-64A w/o Main Rotor blades	589	109[1]	209[2]	12,620[3]

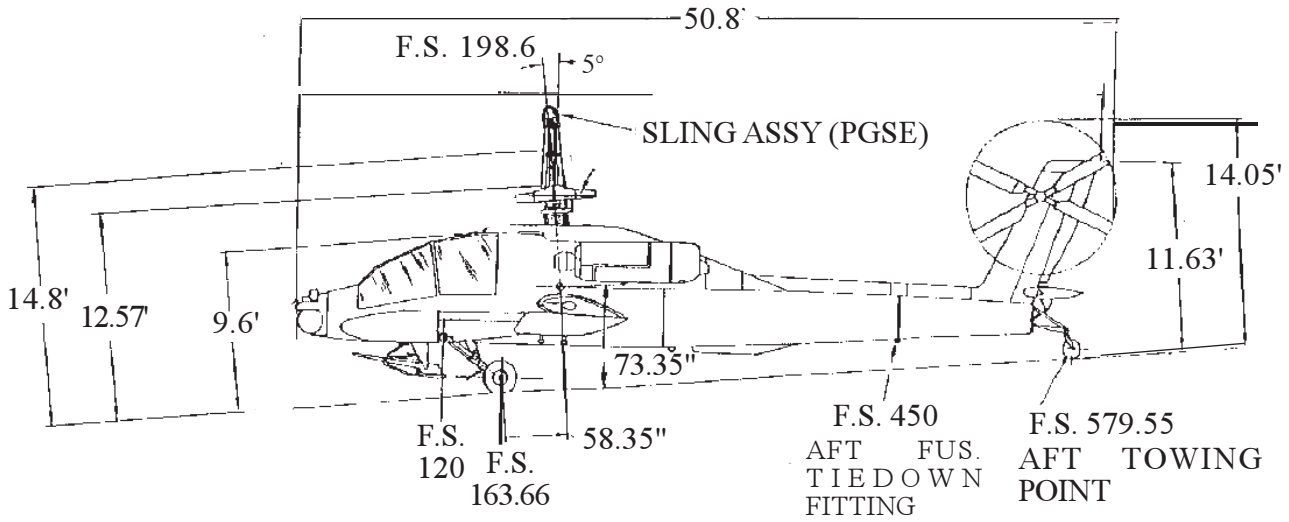
[1] STOWED WINGS AND HORIZONTAL STABILATOR REMOVED.
[2] OVERALL HEIGHT. KNEELED POSITION WITH AIR DATA SENSOR REMOVED AND VERTICAL STABILATOR STOWED, 122.0 INCHES.
[3] WEIGHT INCLUDES 3/4 FUEL IN FORWARD TANK AND 150 GALLONS IN AFT TANK, BUT EXCLUDES AMMUNITION & MISSILES (AR38-250 requirement). TAIL ROTOR BLADES INSTALLED.

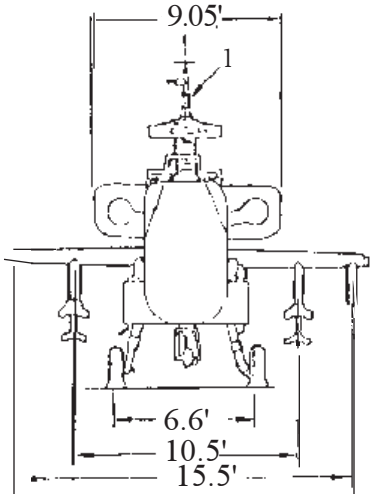
AH-64 Helicopter
Sling Assembly Air Vehicle



NOTE:
ROTOR HEAD RIGGING USING 8-FT ROUND SLINGS AND THE HUB SLING ASSEMBLY SHOWN ON A-51 AND A-52 FOR THE UH-60 MAY ALSO BE USED FOR THE AH-64. CHOKE EACH ARM BETWEEN THE MAST AND PITCH CHANGE LINK LUG.

AH-64A Helicopter With Wings



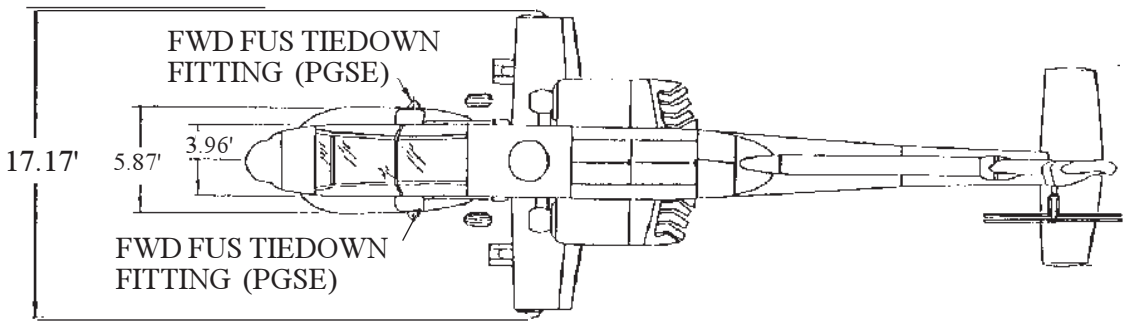


NOTES:

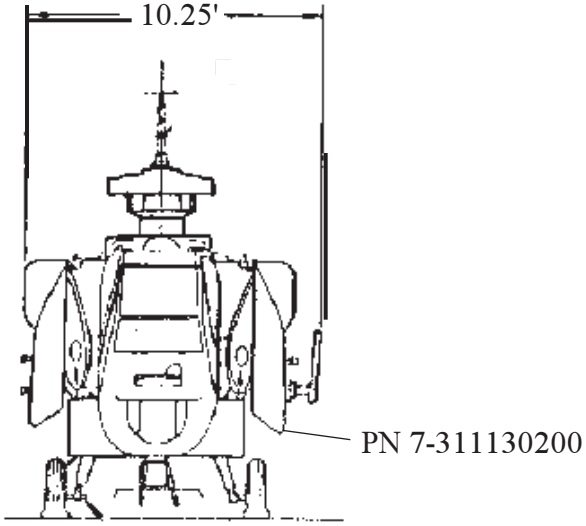
1. AIR DATA SENSOR REMOVED WHEN SLING ASSY IS USED FOR LOADING BY CRANE OR WHEN REMOVING ROTOR HUB/MAST ASSY.
2. PRIOR TO LOADING REMOVE THE ROCKET PODS AND THE HELLFIRE LAUNCHERS.

NOMENCLATURE	FUSELAGE STATION	NSN	PN
FWD FUS TIEDOWN FITTING	120.0	1740-01-242-7265	7-367310009
HUB\MAST ASSY	198.6	1560-01-179-0773	7-319720004-3
SLING ASSY (PGSE)	198.6	1730-01-165-6861	7-262110009-601
AFT FUS. TIEDOWN FITTING	450.0	Not Applicable	Not Applicable
AFT TOWING POINT	579.55	Not Applicable	Not Applicable

AH-64A Helicopter (Top View)

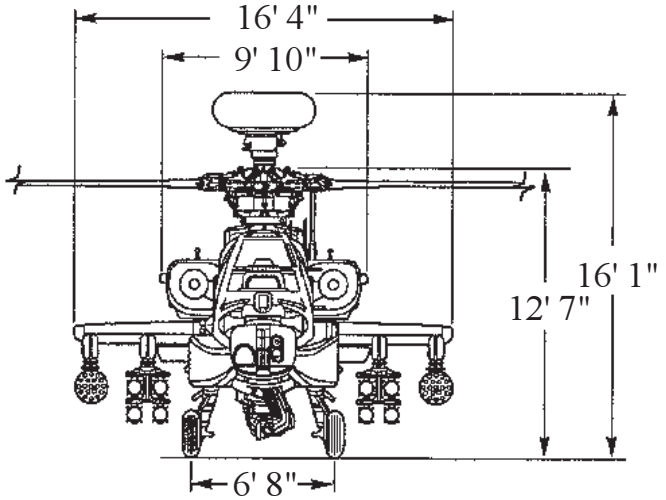


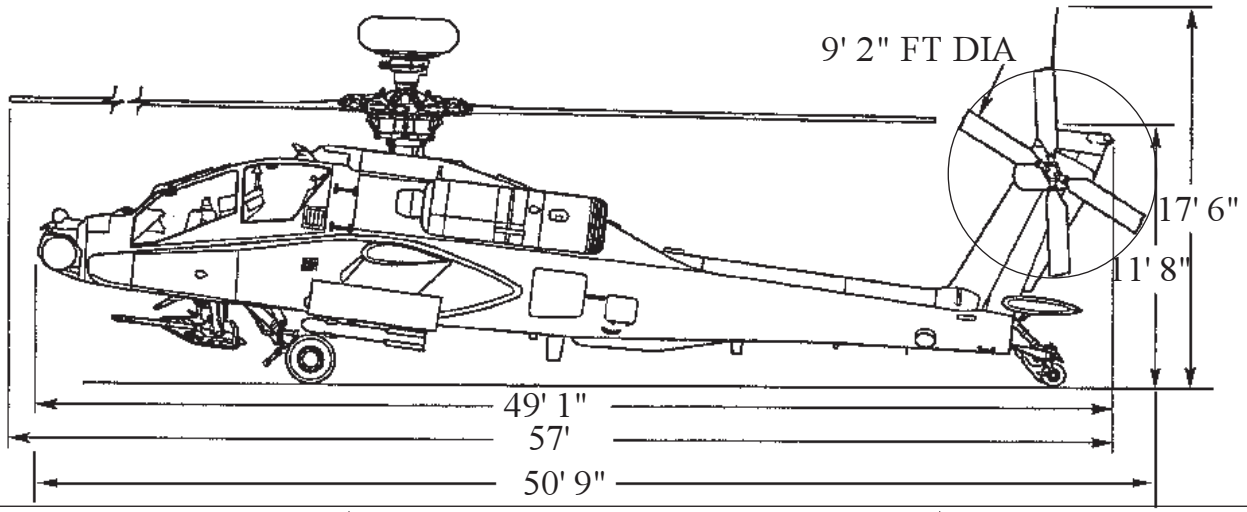
AH-64A Helicopter With Wings Stowed



WINGS REMOVED AND STOWED,
WING STOW KIT USED

AH-64D Longbow Apache

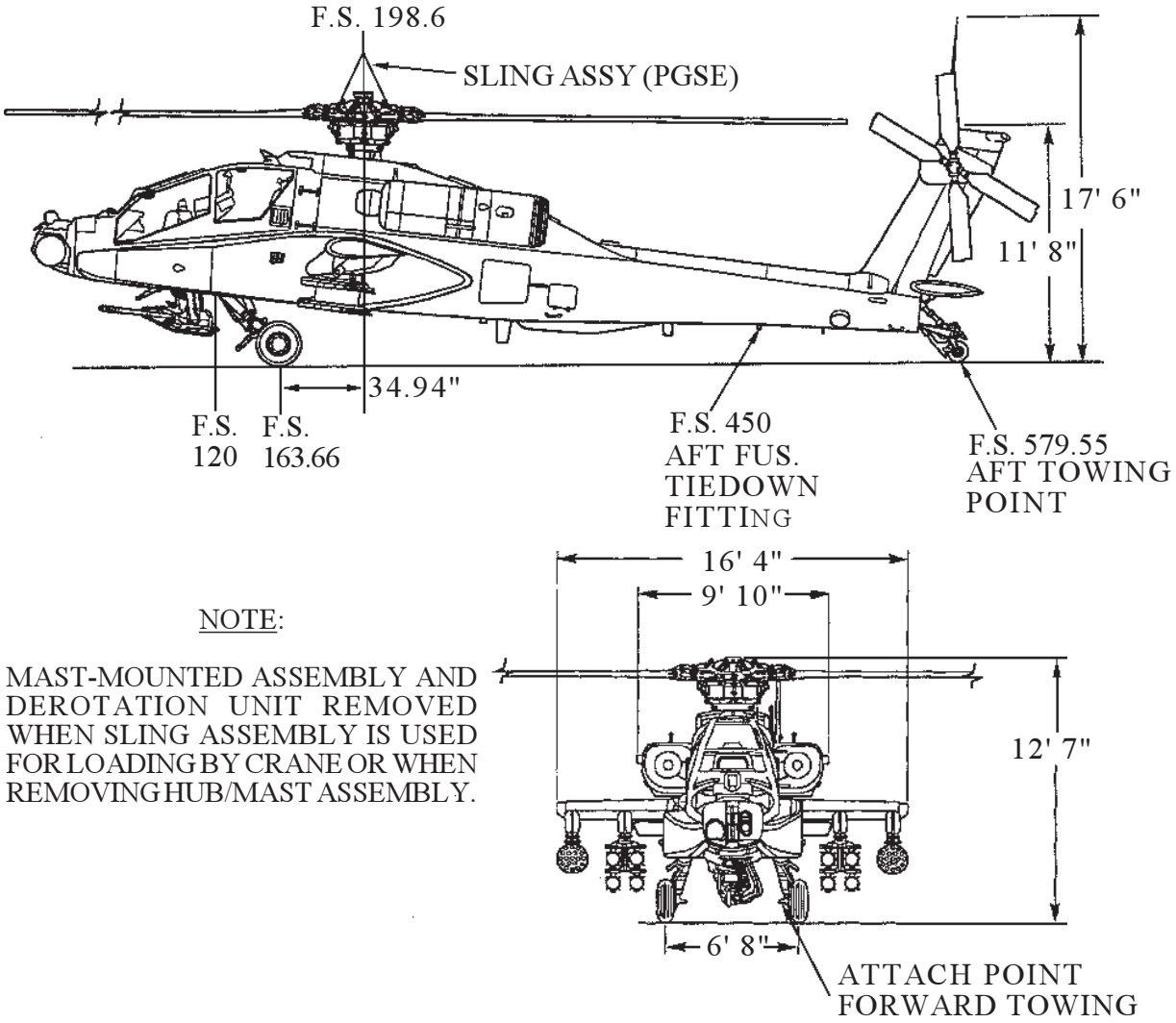




NOMENCLATURE	DIMENSIONS (IN.)			SHIPPING WEIGHT (LB)
	LENGTH	WIDTH	HEIGHT	
AH-64D w/ Main Rotor blades	609	118[1]	151[2]	14,400[3]
AH-64D w/o Main Rotor blades	589	118[1]	151[2]	13,800[3]

[1] WINGS REMOVED. OPERATIONAL WIDTH IS 196.3 INCHES.
[2] HEIGHT WITH RADAR, DEROTATION UNIT, AND TAIL ANTENNA REMOVED.
[3] WEIGHT APPROXIMATE AND INCLUDES 3/4 FUEL, BUT EXCLUDES AMMUNITION, MISSILES AND THE MAST-MOUNTED ASSEMBLY.

AH-64D Longbow Apache With Wings

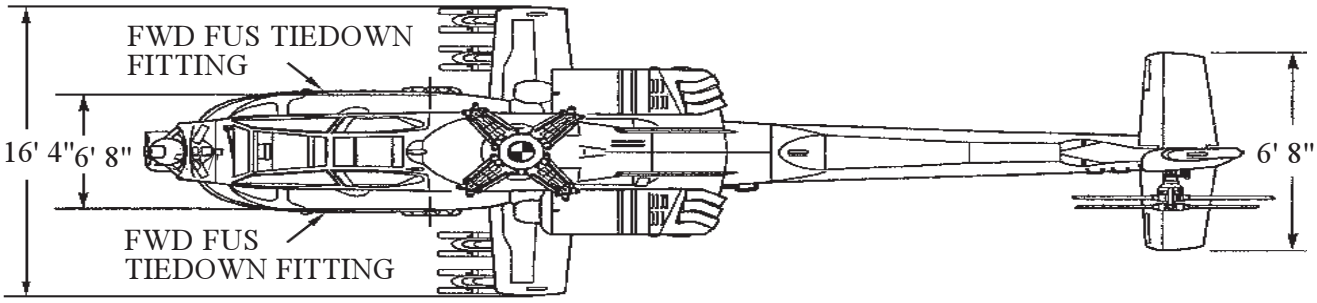


NOTE:

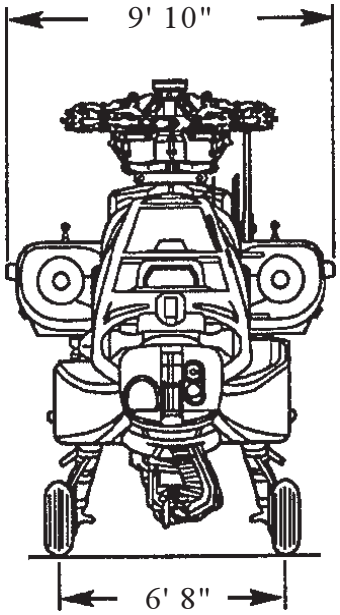
MAST-MOUNTED ASSEMBLY AND DEROTATION UNIT REMOVED WHEN SLING ASSEMBLY IS USED FOR LOADING BY CRANE OR WHEN REMOVING HUB/MAST ASSEMBLY.

NOMENCLATURE	FUSELAGE STATION	NSN	PN
FWD FUS TIEDOWN FITTING	120.0	1740-01-242-7265	7-367310009
FWD FUS TIEDOWN EXTENSION	120.0	TBD	7-567310002
HUB\MAST ASSY	198.6	1560-01-179-0773	7-319720004-3
SLING ASSEMBLY (PGSE)	198.6	1730-01-165-6861	7-262110009-601
AFT FUS TIEDOWN FITTING	450.0	Not Applicable	Not Applicable
AFT TOWING POINT	579.55	Not Applicable	Not Applicable

AH-64D Longbow Apache (Top View)



AH-64D Longbow Apache in Reduced Configuration



ROTOR BLADES, MAST-MOUNTED ASSEMBLY, HORIZONTAL STABILATOR, AND WINGS REMOVED

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NOTES

APPENDIX B

Tiedown Guide for Helicopters

Page

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B. Tiedown Material **B-3**

C. Marine Shipping **B-3**

1. General **B-3**

2. Helicopter Marine Restraint **B-4**

AH-1E/F/P Cobra **B-8**

AH-1T/W Sea Cobra (Navy) **B-13**

UH-1E/F/H/V Iroquois **B-14**

UH-1 and UH-1N Iroquois (Navy) **B-17**

H-2 Sea Sprite (Navy) **B-18**

H-3 Sea King (Navy) **B-19**

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CH-47D Chinook **B-21**

CH-53D Sea Stallion (Navy) **B-24**

C/MH-53E Super Stallion (Navy) **B-25**

OH-58 Kiowa **B-27**

HH-60J/SH-60B Seahawk (Navy) **B-31**

UH-60 Black Hawk **B-32**

AH-64 Apache **B-34**

Tiedown Procedure

The procedures provided herein are to be used as a general guide only; refer to the appropriate preparation for shipment manual listed in the Bibliography for approved procedures.

A. General

1. Use the tiedown diagrams and procedures published in the aircraft preparation for shipment manuals.

2. Inspect all tiedown equipment prior to movement to the staging area.

3. Aircraft maintenance personnel will supervise tiedown (lashing) of helicopters. The shipping unit provides technical assistance on their aircraft tiedown.

4. Chock all wheels.

5. Place wood under the entire length of the helicopter skids to prevent sparking of the skid shoes on the steel deck.

6. Maintain at least 12 to 18 inches clearance between helicopters and the bulkheads (UH-60 series might require more).

7. Blocking and bracing (shoring) between helicopters is not authorized.

8. Ensure that tiedown chains or straps do not chafe on helicopters.

9. Do not attempt to preload tiedown straps on mooring fittings. All tiedowns are to be tightened only until slack is removed. Over tensioning tiedowns can damage the aircraft.

10. Make sure shrink wrap film does not cover up tiedown provisions.

11. The notation "F.S." refers to the fuselage station on the helicopter.

B. Tiedown material

TABLE 1
REQUIRED TIEDOWN DEVICES

Item	National Stock Number	Quantity Required Per Aircraft					
		AH-1	UH-1	CH-47	OH-58	UH-60	AH-64
MB-1 chain	1670-00-516-8405	10	16	18	6	12	8
MB-1 devices	1670-00-212-1149	10	16	18	6	12	8
CGU-1B straps	5340-00-980-9277				4		

Note 1: Pad UH-1 skid cuffs to prevent damage from chains (old fire hose works well). Ensure that tiedown shackles are installed on bell mooring/jacking points.
Note 2: Use standard shackles (part number 204-021-393-1, NSN 4030-00-977-6940 or part number 204-031-464-1, NSN 4030-00-072-1072) on AH-1 (six each), UH-1 (four each) and OH-58 (three each) series aircraft to simplify tiedown.

C. Marine Shipping

1. General

Tiedown points on some vessels are very limited. Tiedown chain angles on helicopters are critical. When tiedown points are not sufficient, provide helicopter tiedown points by running vessel lashing gear (chains) between vessel tiedown points. Connect additional lashing gear, as required, to provide a grid on the vessel deck that will provide tiedown points at the required angles. These chains should be as tight as possible and in place before any helicopter tiedown chains are installed. Follow the instructions below and proceed as illustrated (page B-5) in the attached sketch:

a. Place helicopters as required.

b. Install wheel chocks as required.

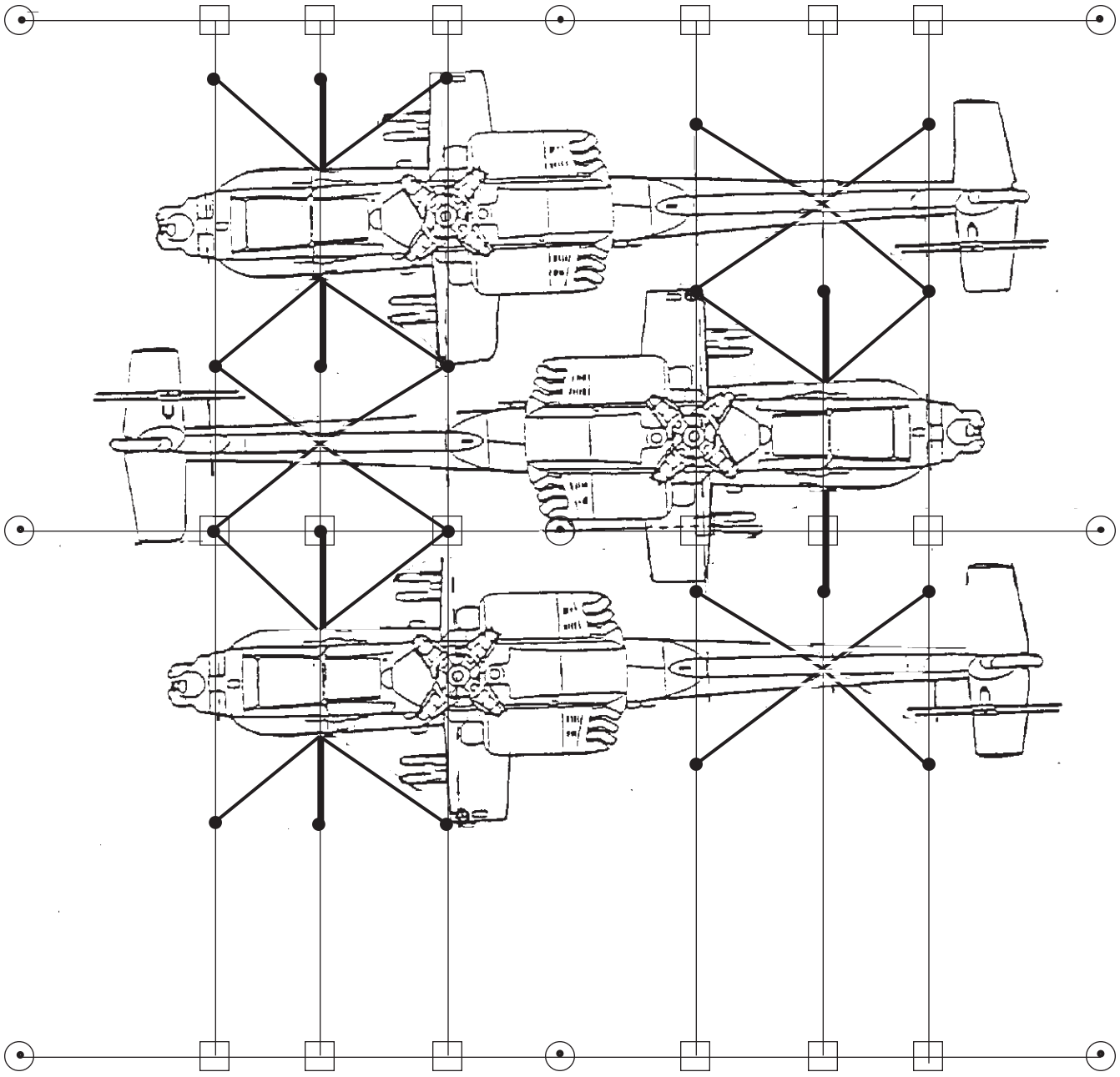
c. Connect chains (vessel's lashing gear) between deck lashing points as appropriate. Make these chains as tight as possible using either CGU-1/B (5,000 lb), MB-1 (10,000 lb), or MB-2 (25,000 lb) tiedown devices (page B-6).

d. Connect chains between "deck chains" as required to provide tiedown points. Make these chains also as tight as possible.

e. Install helicopter tiedown as shown in figure B-5. They are to be tightened enough to remove slack. If tiedown chains and straps are too slack, the helicopters will be damaged due to movement. Over-tightening will also cause structural damage.

2. Helicopter Marine Restraint

Dunnage is not required or authorized as a restraint procedure for helicopters. Helicopters will be tied down with straps and chains. Tiedown tension will be just tight enough to eliminate all slack in the tiedown device. Over tightening may cause structuraldamage to the helicopter. Special procedures have been developed for OH-58 and UH-1 series helicopters because of inadequate tiedown provisions.

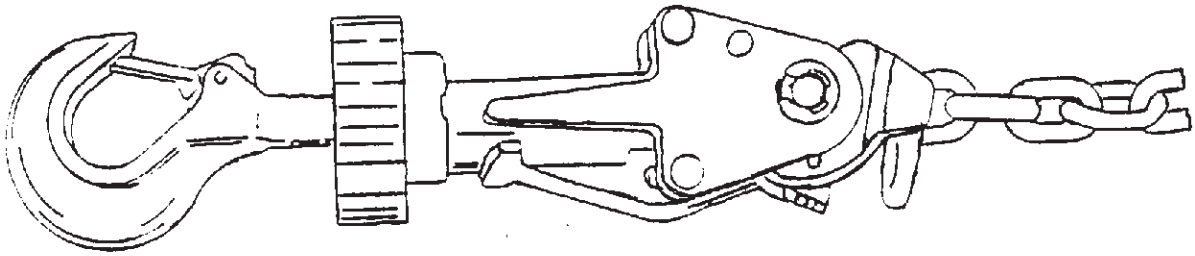


Chains between deck lashing points (DECK CHAINS). Install first and as tight as possible.

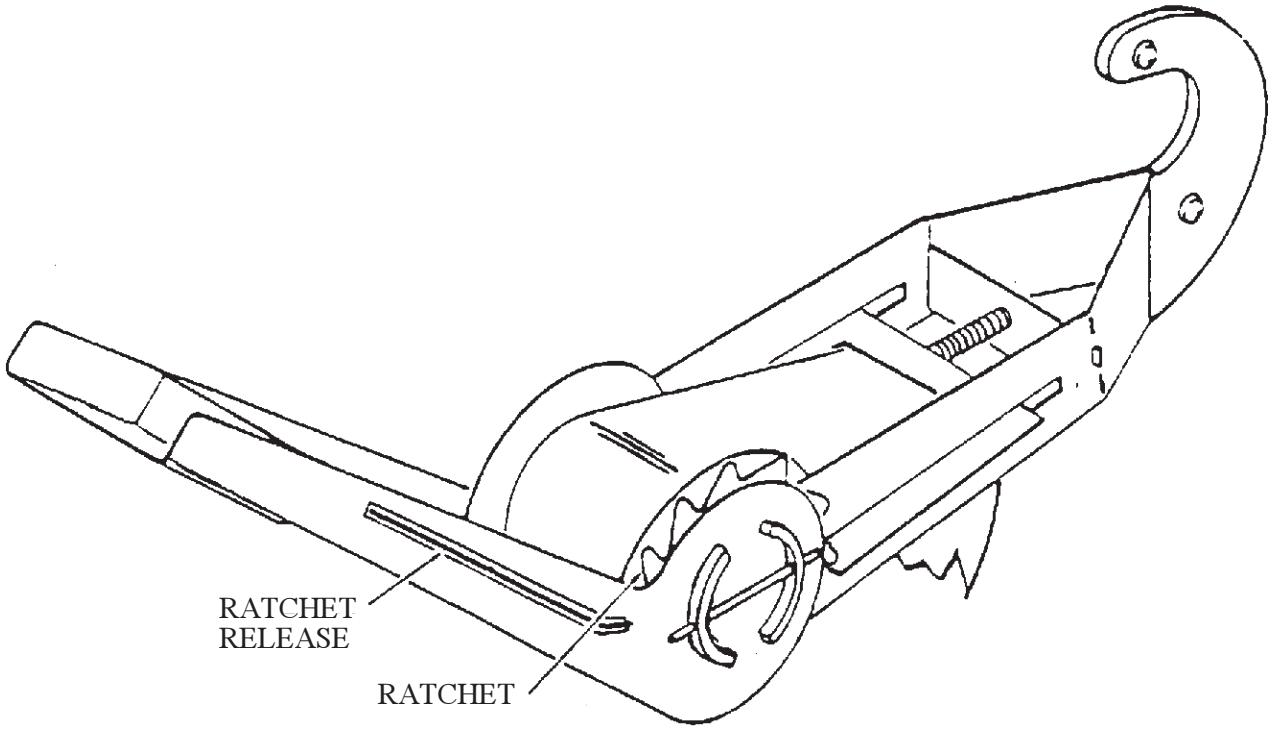
Tiedown chains. Install last and tighten only enough to remove slack.

Chains between DECK CHAINS. Install as tight as possible.

Helicopter Tiedown Devices

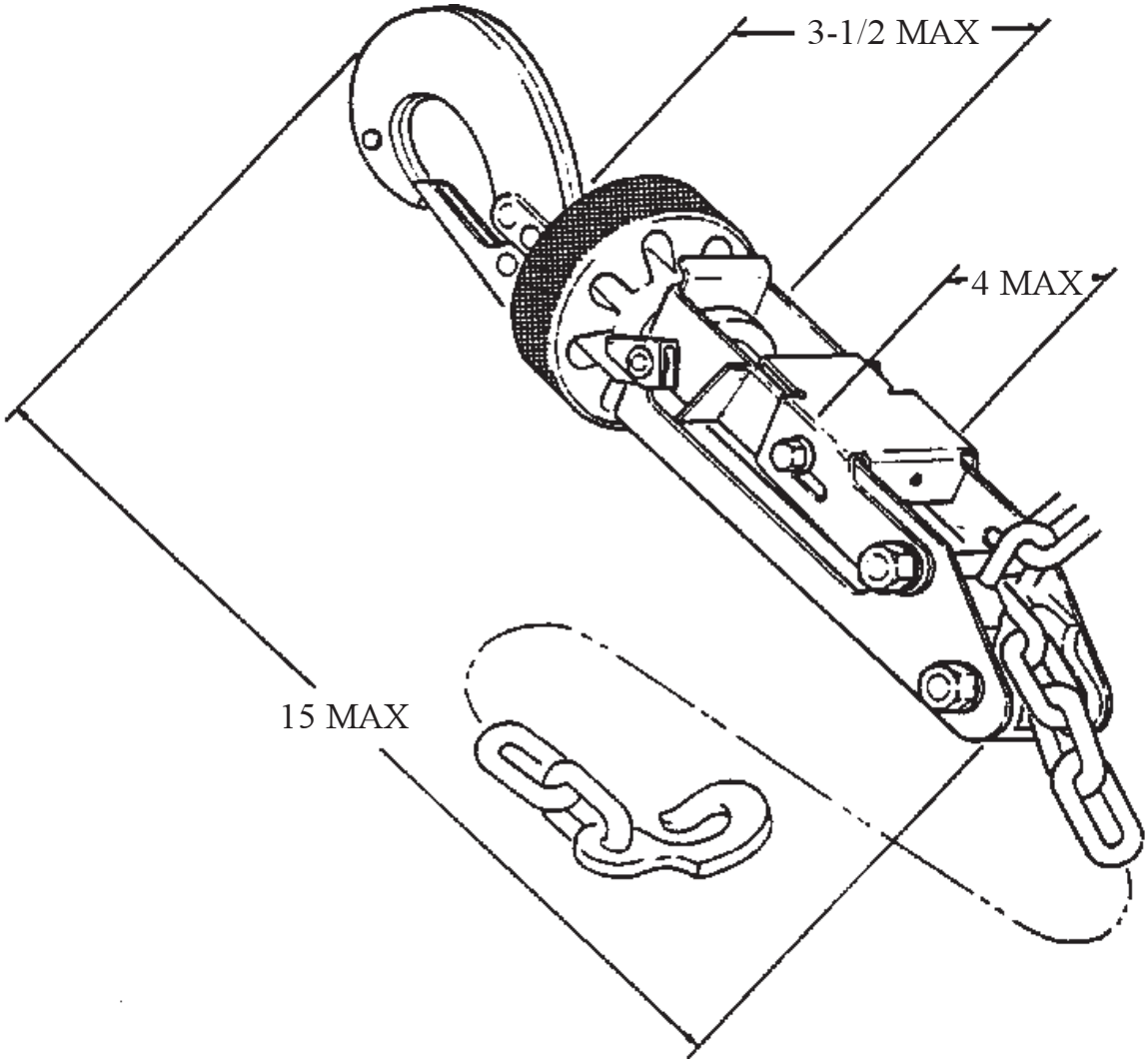


NOTES: 1. MB-1 (10,000-LB) TIEDOWN DEVICE NSN 1670-00-212-1149.
2. 10,000-POUND TIEDOWN CHAIN NSN 1670-00-516-8405.
3. MB-2 (25,000-LB) TIEDOWN DEVICE NSN 1670-00-212-1150.
4. 25,000-POUND TIEDOWN CHAIN NSN 1670-00-778-4079.



NOTE: CGU-1/B (5,000-LB) TIEDOWN DEVICE
NSN 1670-00-725-1437
P/N FE12687C240

MB-1 Chain Adjuster Assembly



MB-1 CHAIN ADJUSTER ASSEMBLY

EASY LOADING
POSITIVE LOCK
ULTIMATE LOAD - 14,100 LB
MEETS REQ OF SPECIFICATION - MIL-T-25959 TYPE MB-1
TO BE USED WITH TYPE 1 CHAIN ASSEMBLY PER MIL-C-6458

QUICK RELEASE AT 10,000-LB LOAD
ADJUSTMENT TO ANY CHAIN LINK-PLUS 3-1/2" OF SCREW ADJUSTMENT.
WEIGHT - 3-1/2 LB MAXIMUM
HOOK - THROAT -8"
STEEL PARTS CADMIUM PLATED

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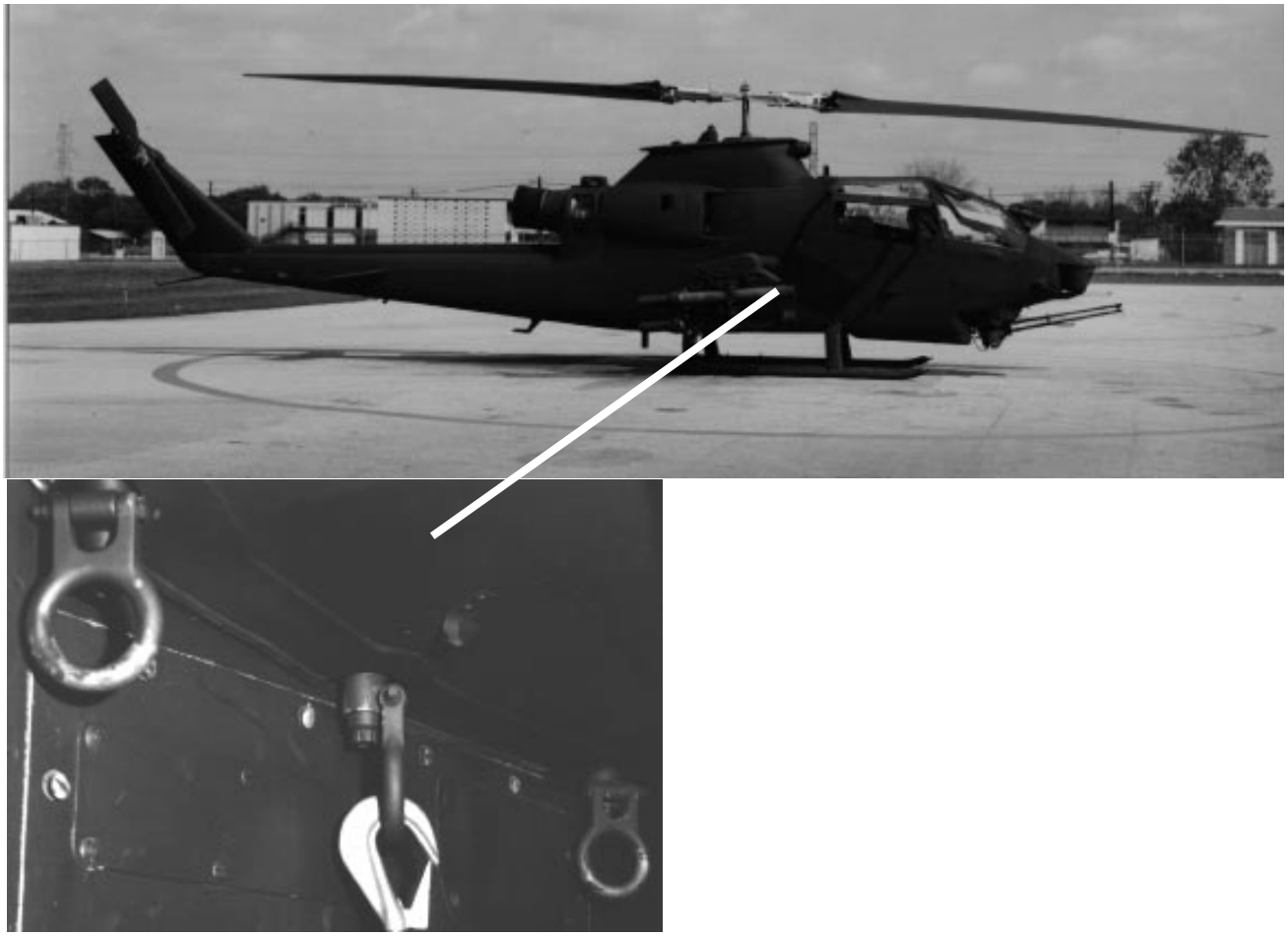
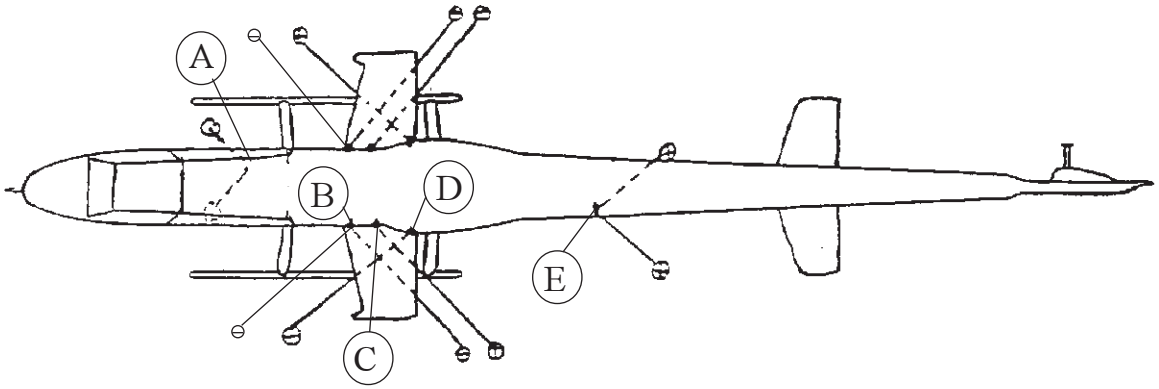
AH-1E/F/P Cobra

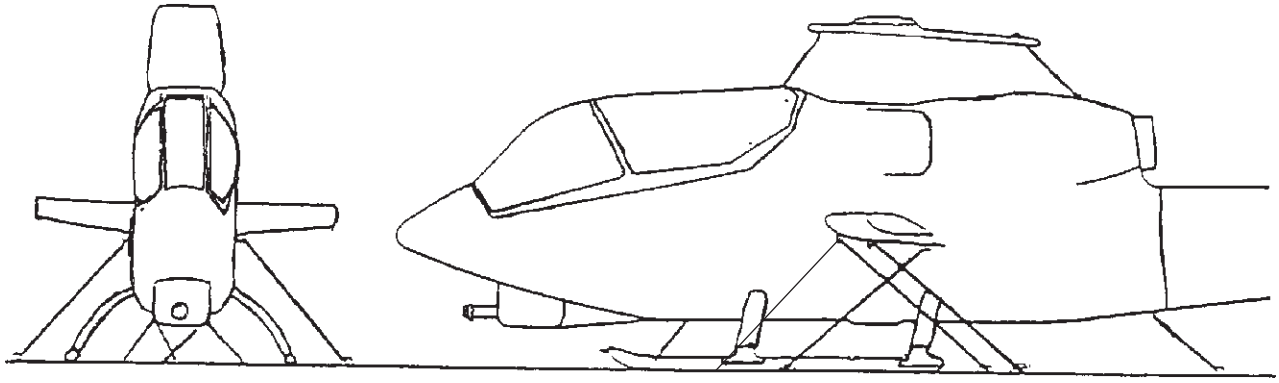


AH-1 UNDER WING TIEDOWN FITTINGS

Tiedown Pattern, AH-1 Helicopter with Winglets Installed



TIEDOWN POINT	FUSELAGE STATION LOCATION
A	139.35
B	187.30
C	197.67
D	212.63
E	299.90



NOTES:

1 SECURE ALL TIEDOWN DEVICES AT AN ANGLE BETWEEN 30° AND 60°. 45° IS IDEAL.

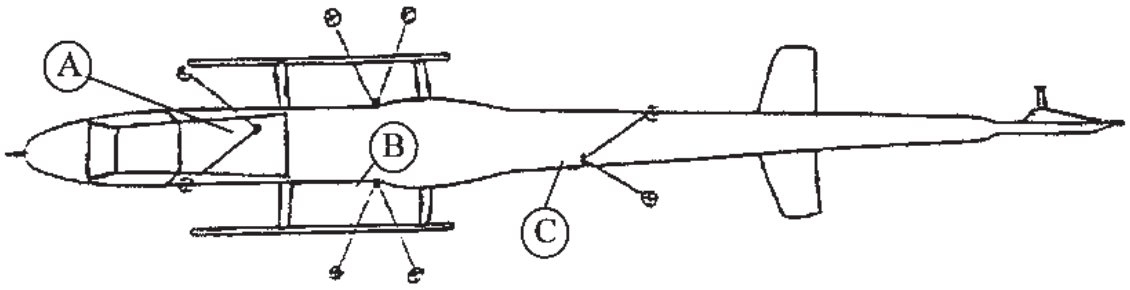
2 USE ONLY MB-1 TIEDOWN DEVICES FOR SECURING HELICOPTERS (12 REQD).

3 APPLY ONLY ENOUGH TENSION TO REMOVE FREE PLAY FROM THE TIEDOWN DEVICES.

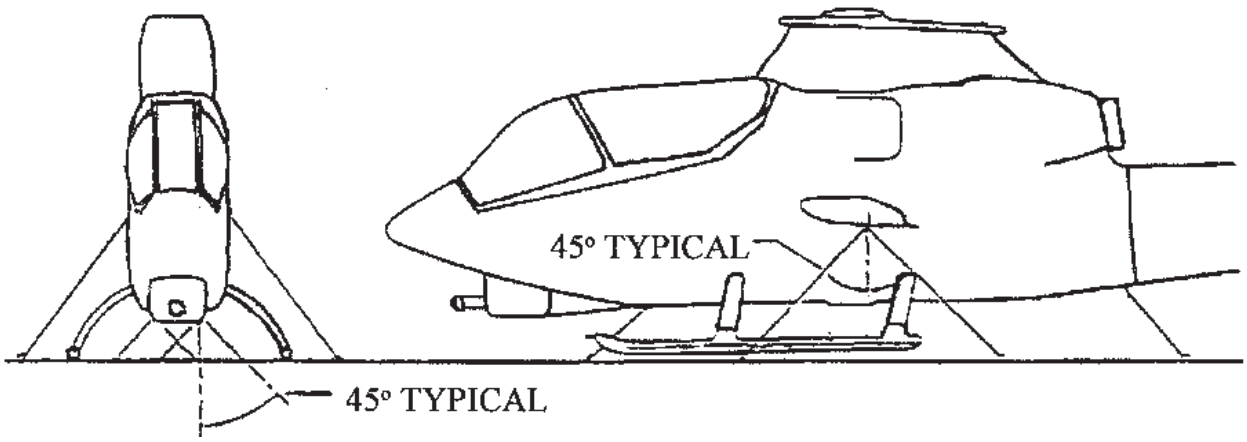
4 SECURE TO PROVISIONS WITH TIEDOWN DEVICES RATED TO AT LEAST 10,000 LB.

5 FABRIC STRAPS MAY BE USED TO SECURE THE TAIL SKID FOR STABILITY.

Tiedown Pattern, AH-1 Helicopter with Winglets Removed



TIEDOWN POINT	FUSELAGE STATION LOCATION
A	139.35
B	197.67
C	299.90



NOTES:

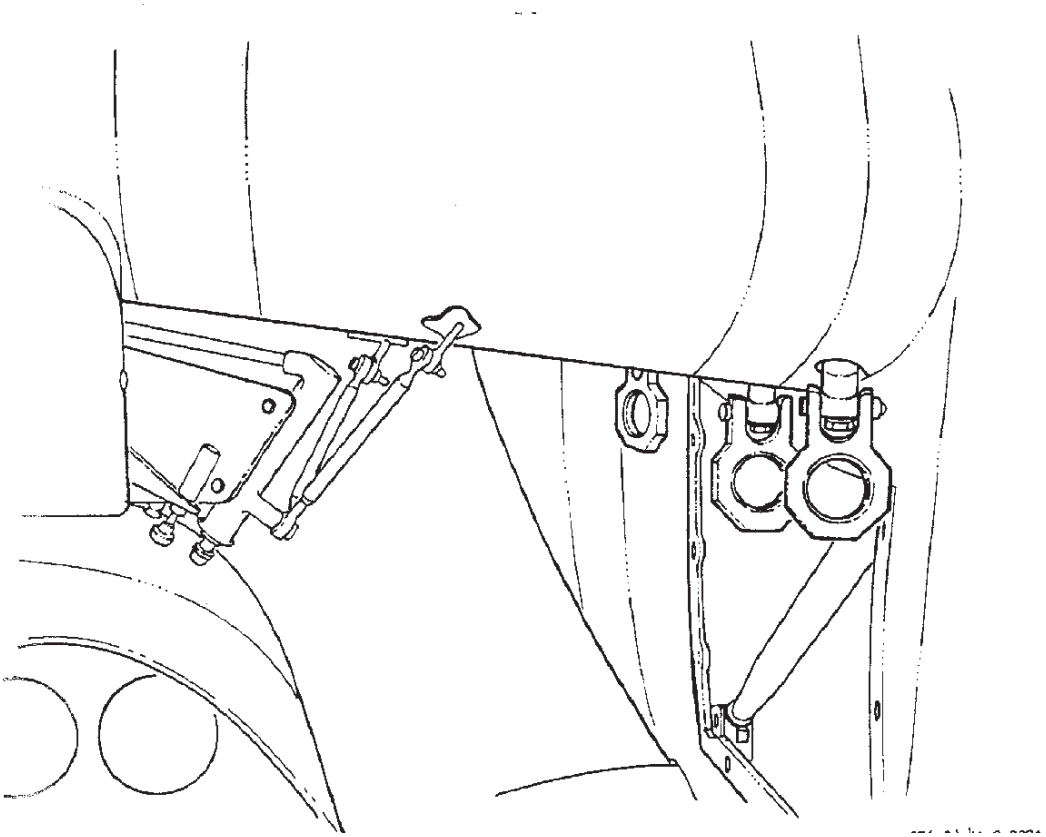
1 SECURE ALL TIEDOWN DEVICES AT AN ANGLE BETWEEN 30° AND 60°. 45° IS IDEAL.

2 USE ONLY MB-1 OR MB-2 TIEDOWN DEVICES FOR SECURING HELICOPTERS (8 REQD).

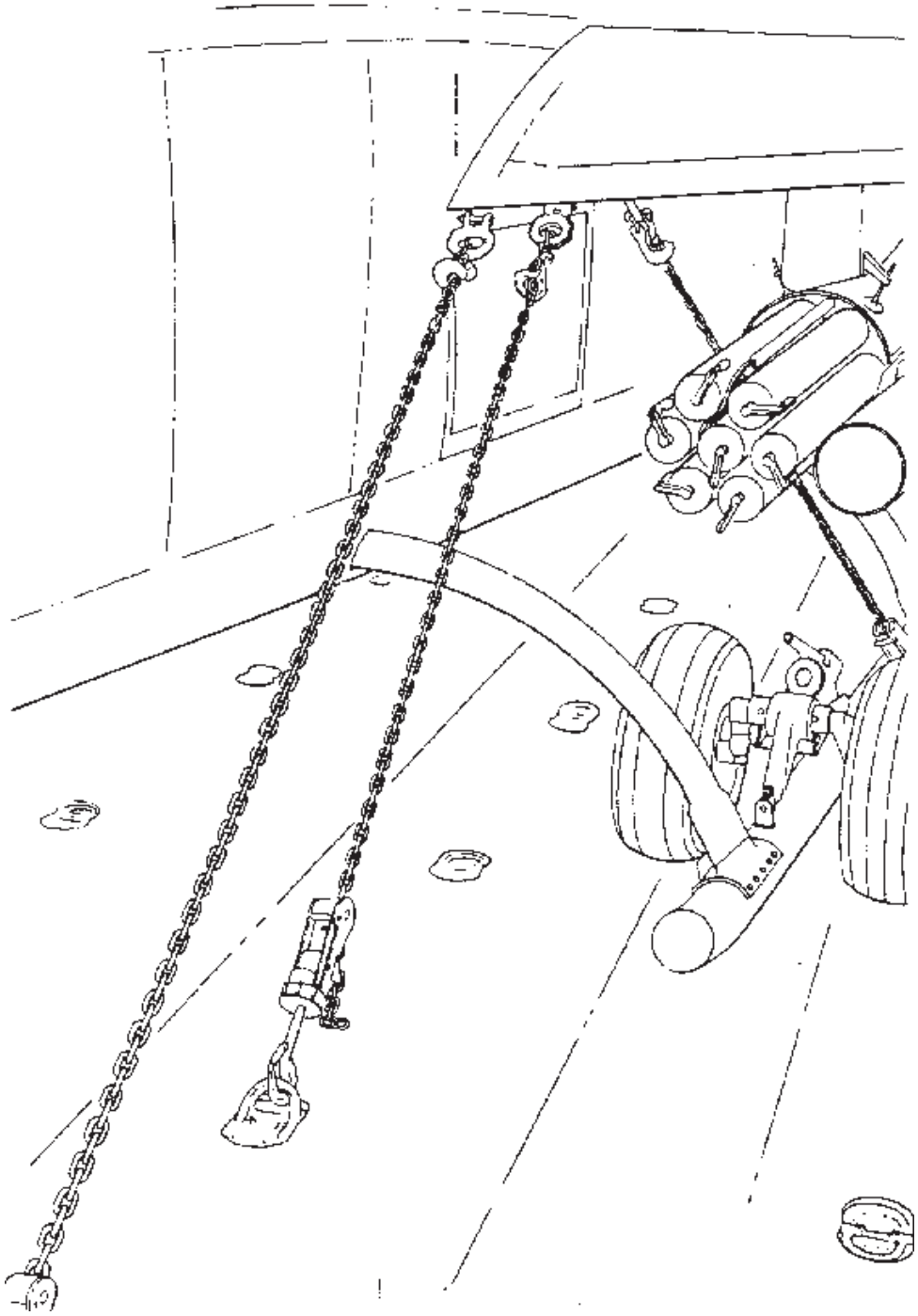
3 APPLY ONLY ENOUGH TENSION TO REMOVE FREE PLAY FROM THE TIEDOWN DEVICES.

4 SECURE TO PROVISIONS WITH TIEDOWN DEVICES RATED TO AT LEAST 10,000 LB. WHEN MB-1/2 ARE NOT AVAILABLE TIEDOWN DEVICES MAY BE COMBINED TO MEET THIS STRENGTH REQUIREMENT.

AH-1 Stub Wing Tiedown Clevises



Tiedown of AH-1 Helicopter with Ground Handling Wheels and Protective Shoring



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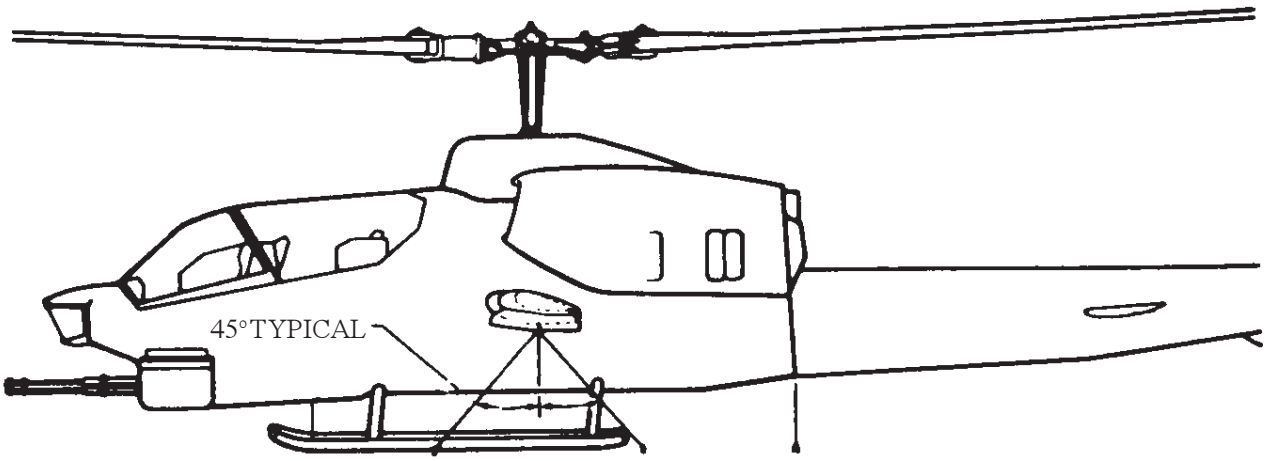
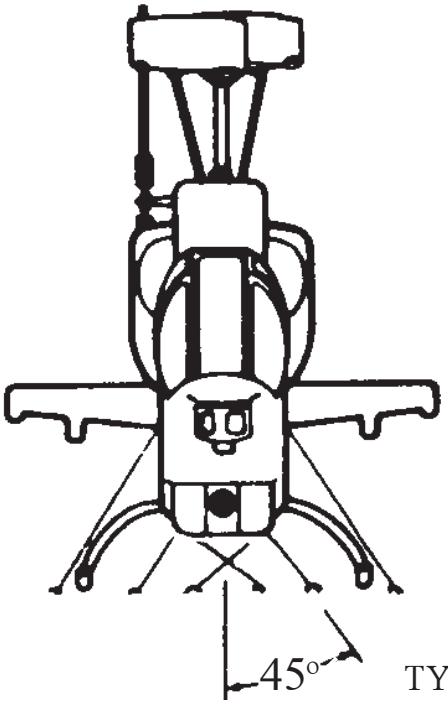
AH-1T/W Sea Cobra (Navy)
Tiedown Configuration





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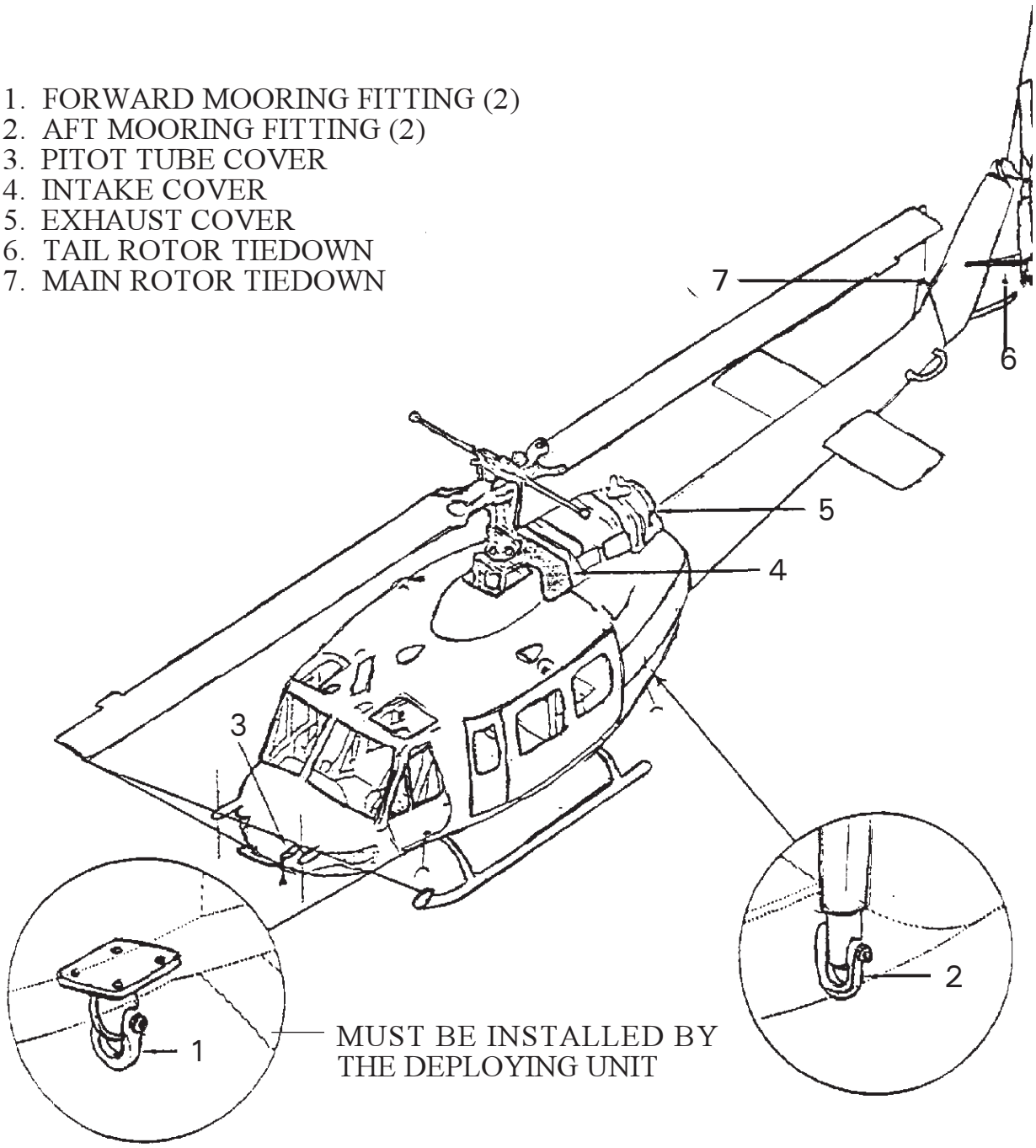
UH-1E/F/H/V Iroquois

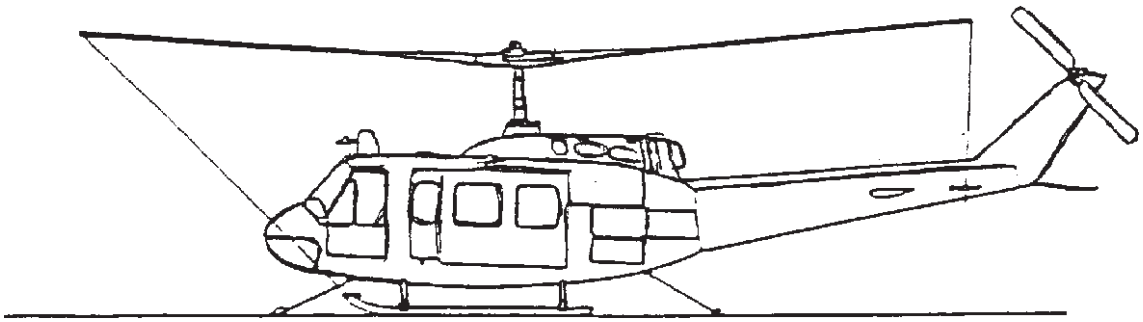
UH-1 TIEDOWN RING ATTACHED TO JACKING POINT

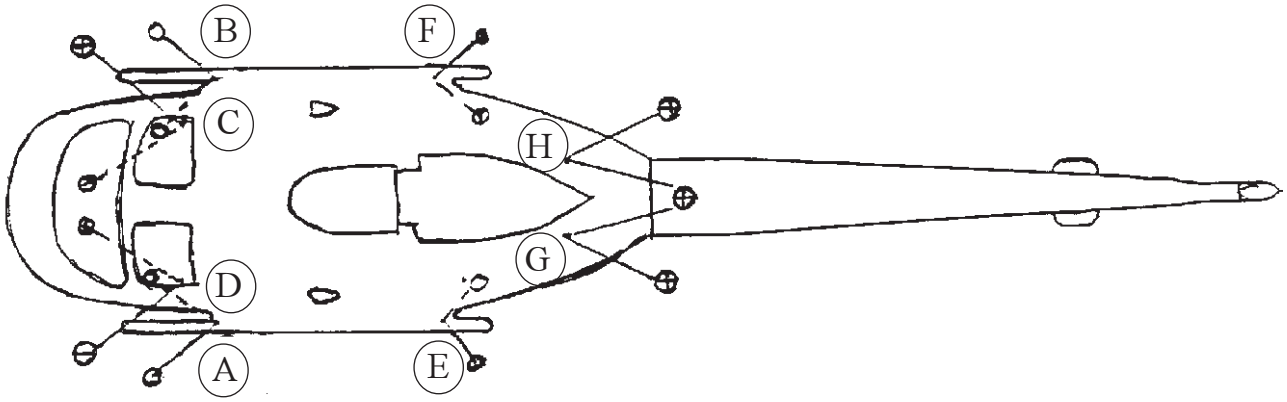
UH-1E/F/H/V Helicopter

1. FORWARD MOORING FITTING (2)
2. AFT MOORING FITTING (2)
3. PITOT TUBE COVER
4. INTAKE COVER
5. EXHAUST COVER
6. TAIL ROTOR TIEDOWN
7. MAIN ROTOR TIEDOWN



UH-1E/F/H/V Helicopter





NOTES:

1 SECURE ALL TIEDOWN DEVICES AT AN ANGLE BETWEEN 30° AND 60°. 45° IS IDEAL.

2 USE MB-1 TIEDOWN DEVICES FOR SECURING HELICOPTERS (16 REQD).

3 APPLY ONLY ENOUGH TENSION TO REMOVE FREE PLAY FROM THE TIEDOWN DEVICES.

4 SECURE TO PROVISIONS WITH TIEDOWN DEVICES RATED TO AT LEAST 10,000 LB.

5 FABRIC STRAPS MAY BE USED TO SECURE THE TAIL SKID FOR STABILITY.

(A)(B)(E)(F) CUSHION SKIDS AND CROSSTUBES AT THESE POINTS TO PREVENT DAMAGE.

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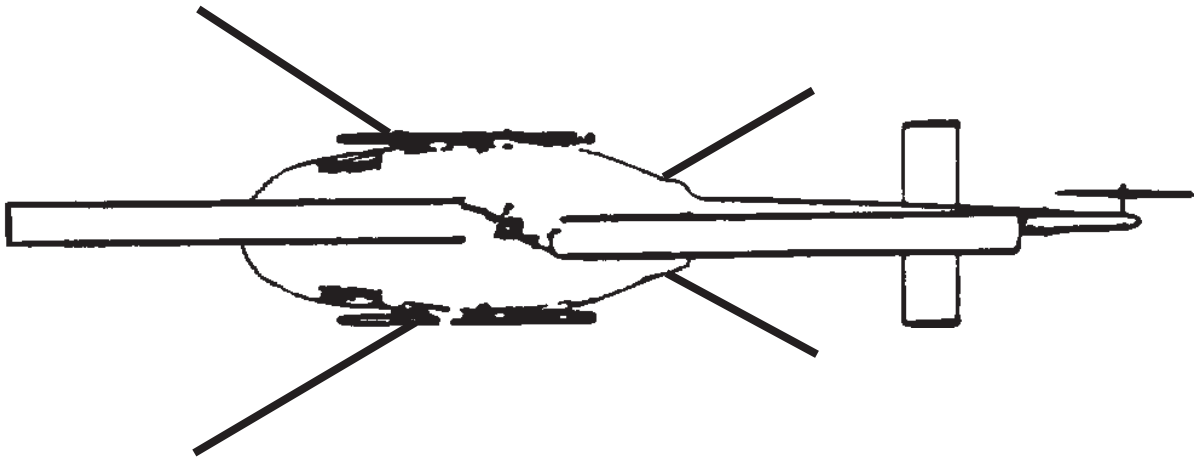
UH-1 and UN-1N Iroquois (Navy) Tiedown Configuration



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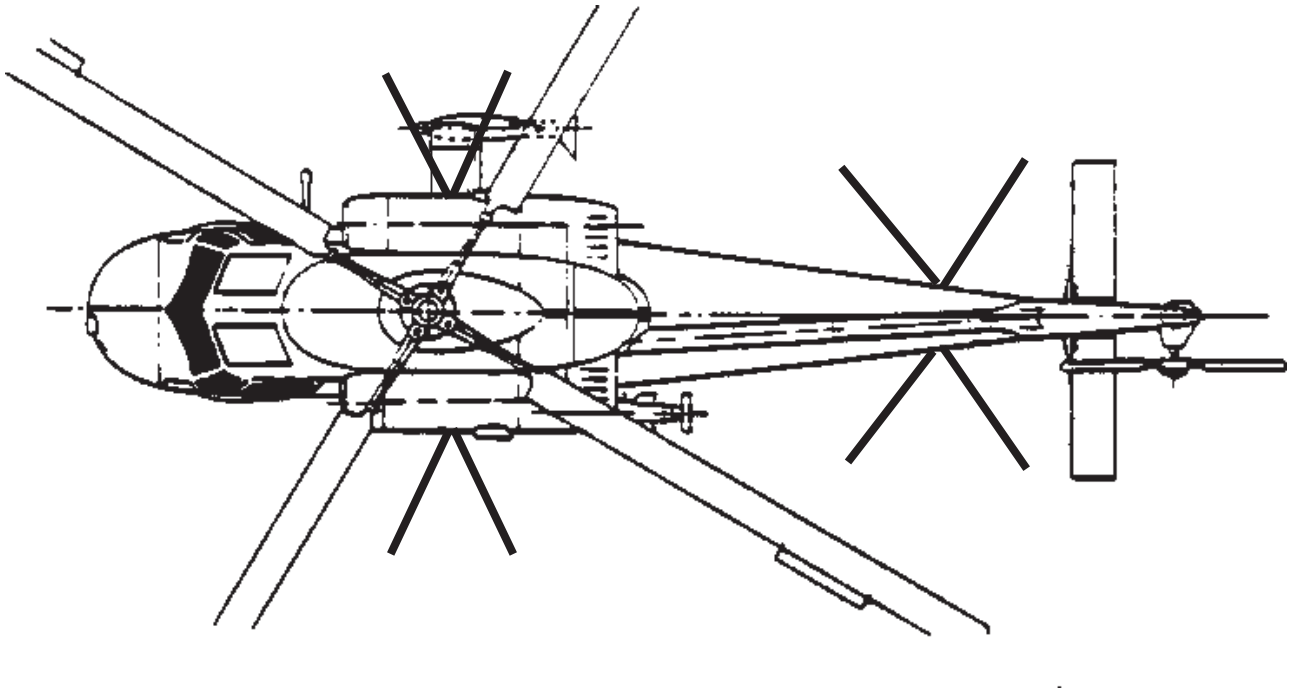
H-2 Sea Sprite (Navy)
Tiedown Configuration



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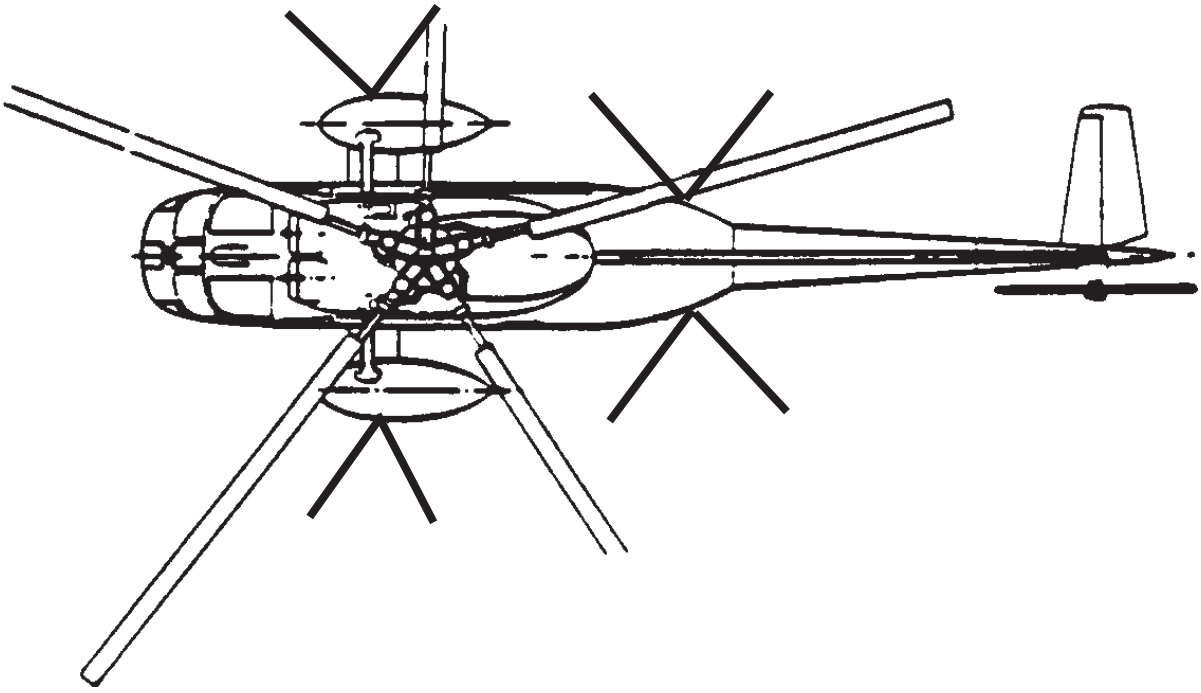
H-3 Sea King (Navy)
Tiedown Configuration



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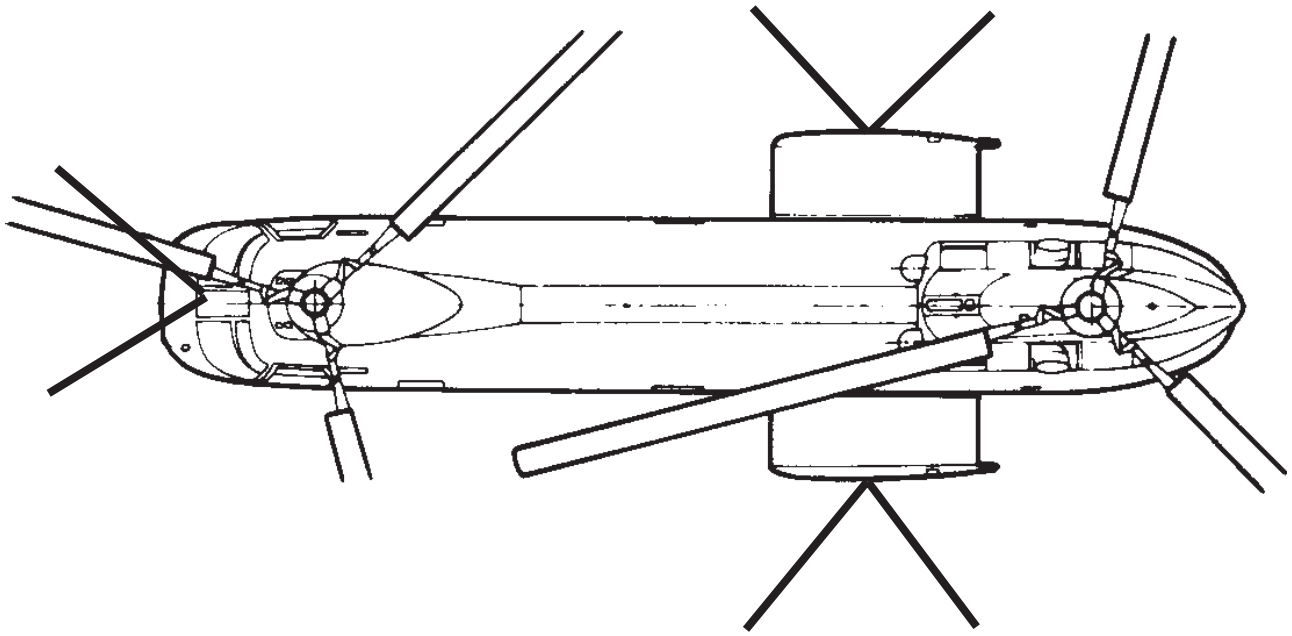
H-46 Sea Knight (Navy)
Tiedown Configuration



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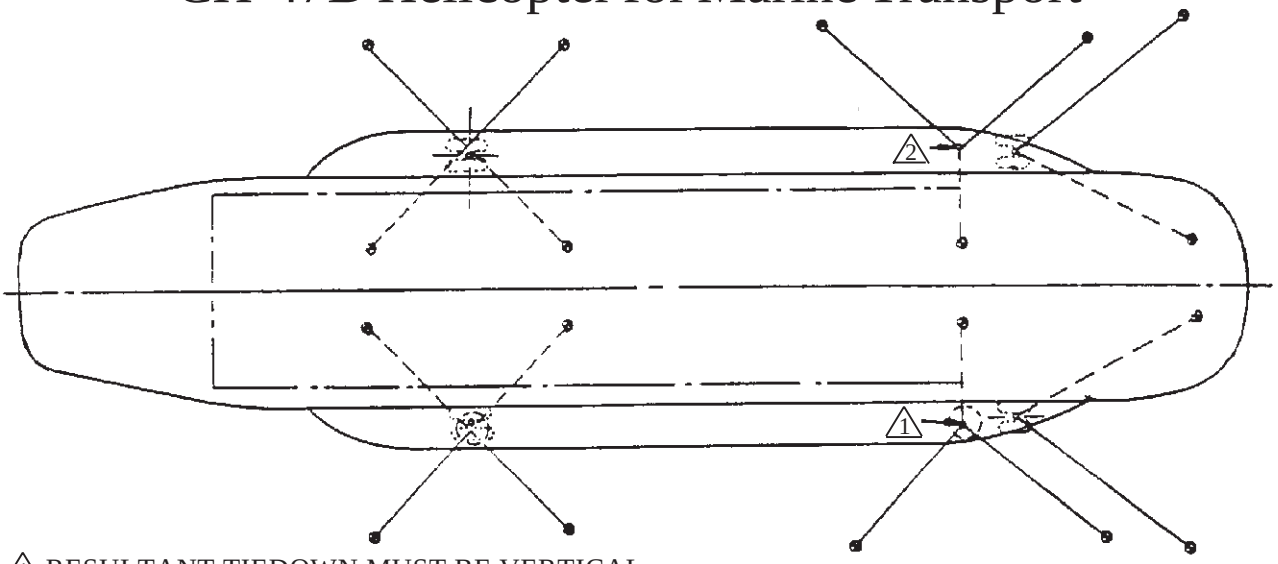
CH-47D Chinook

CH-47 AFT TIEDOWN FITTING

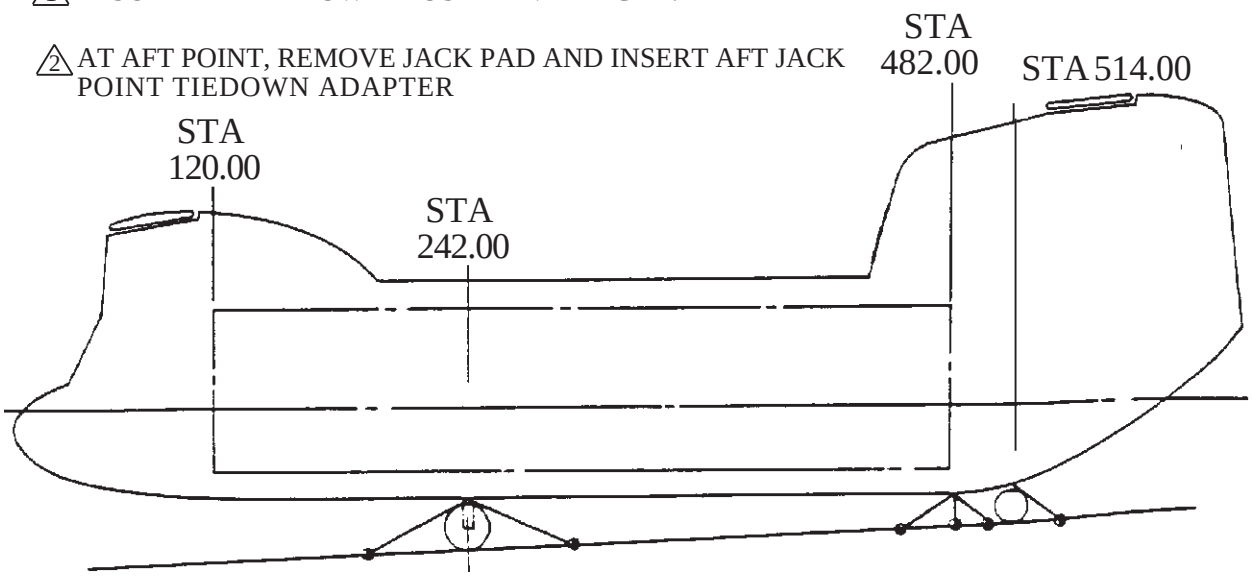
CH-47 FORWARD TIEDOWN FITTING

CH-47D Helicopter for Marine Transport



1 RESULTANT TIEDOWN MUST BE VERTICAL.

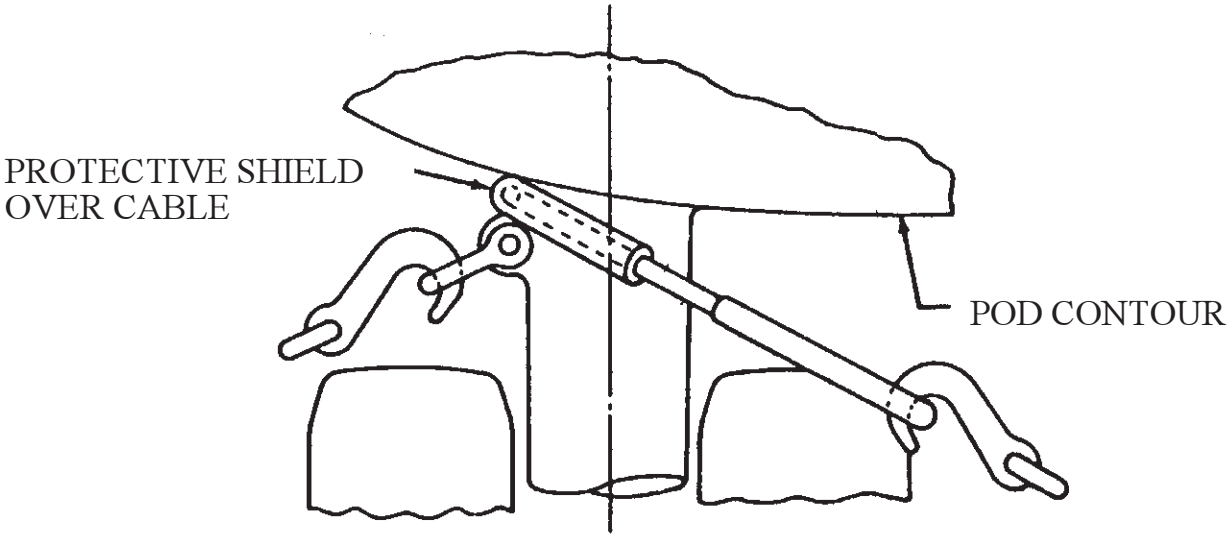
2 AT AFT POINT, REMOVE JACK PAD AND INSERT AFT JACK POINT TIEDOWN ADAPTER

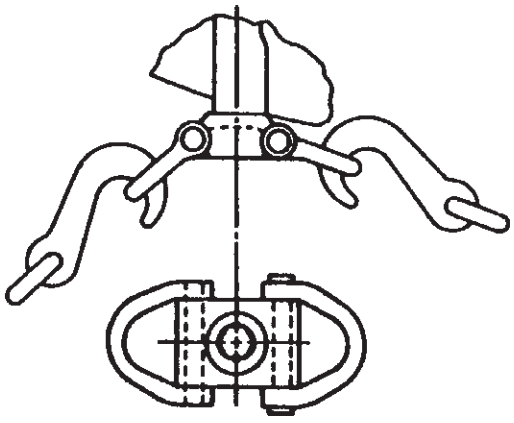


NOTES:

1. SECURE ALL TIEDOWN DEVICES AT AN ANGLE BETWEEN 30° AND 60°. 45° IS THE IDEAL.
2. USE ONLY MB-1 OR MB-2 CHAINS, OR POLYESTER STRAPS WITH A BREAKING STRENGTH OF AT LEAST 10,000 POUNDS (FOR U.S. STRAPS, THE MINIMUM BREAKING STRENGTH IS 3 TIMES THE WORKING LOAD LIMIT).
3. USE INDIVIDUAL CHAINS OR STRAPS FOR EACH LINE (18 REQD). DO NOT RUN THE TIEDOWNS THROUGH THE AIRCRAFT SHACKLES.
4. APPLY ONLY ENOUGH TENSION TO REMOVE FREE PLAY FROM THE TIEDOWN DEVICES.
5. SECURE THE INNER TIEDOWN DEVICES ON THE FORWARD STRUTS BY USING TWO CLEVISES TO CLEAR THE STRUT. PAD THE STRUT TO PREVENT CHAFING.

CH-47D Tiedown Fittings





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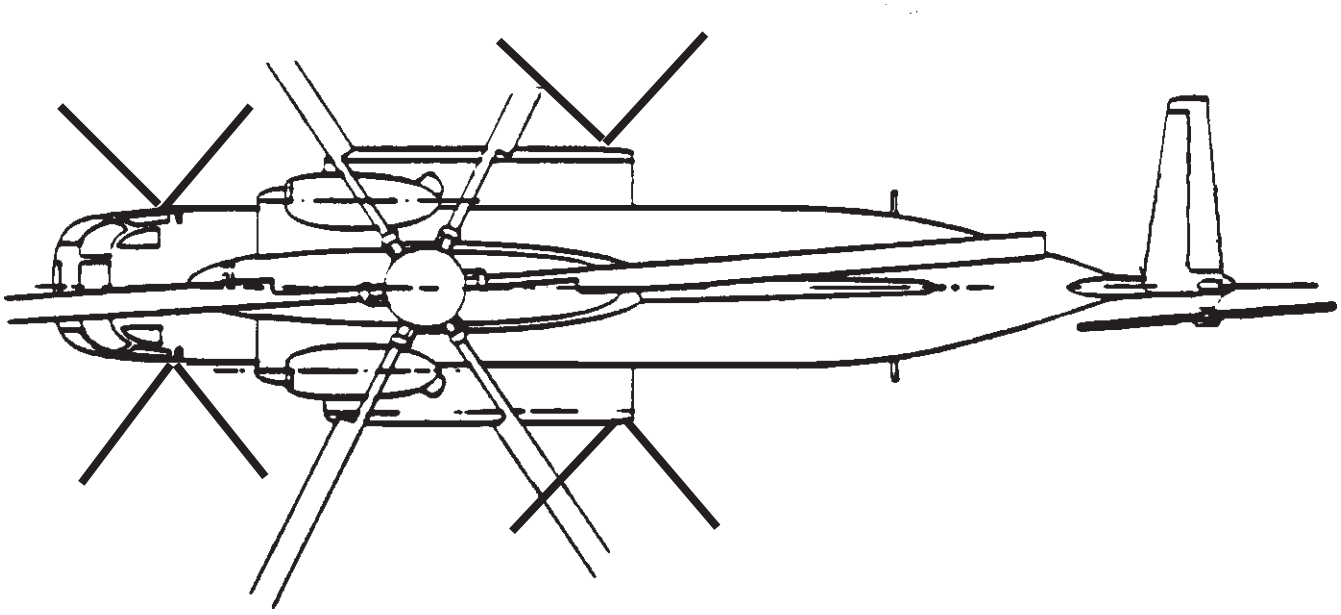
CH-53D Sea Stallion (Navy)
Tiedown Configuration



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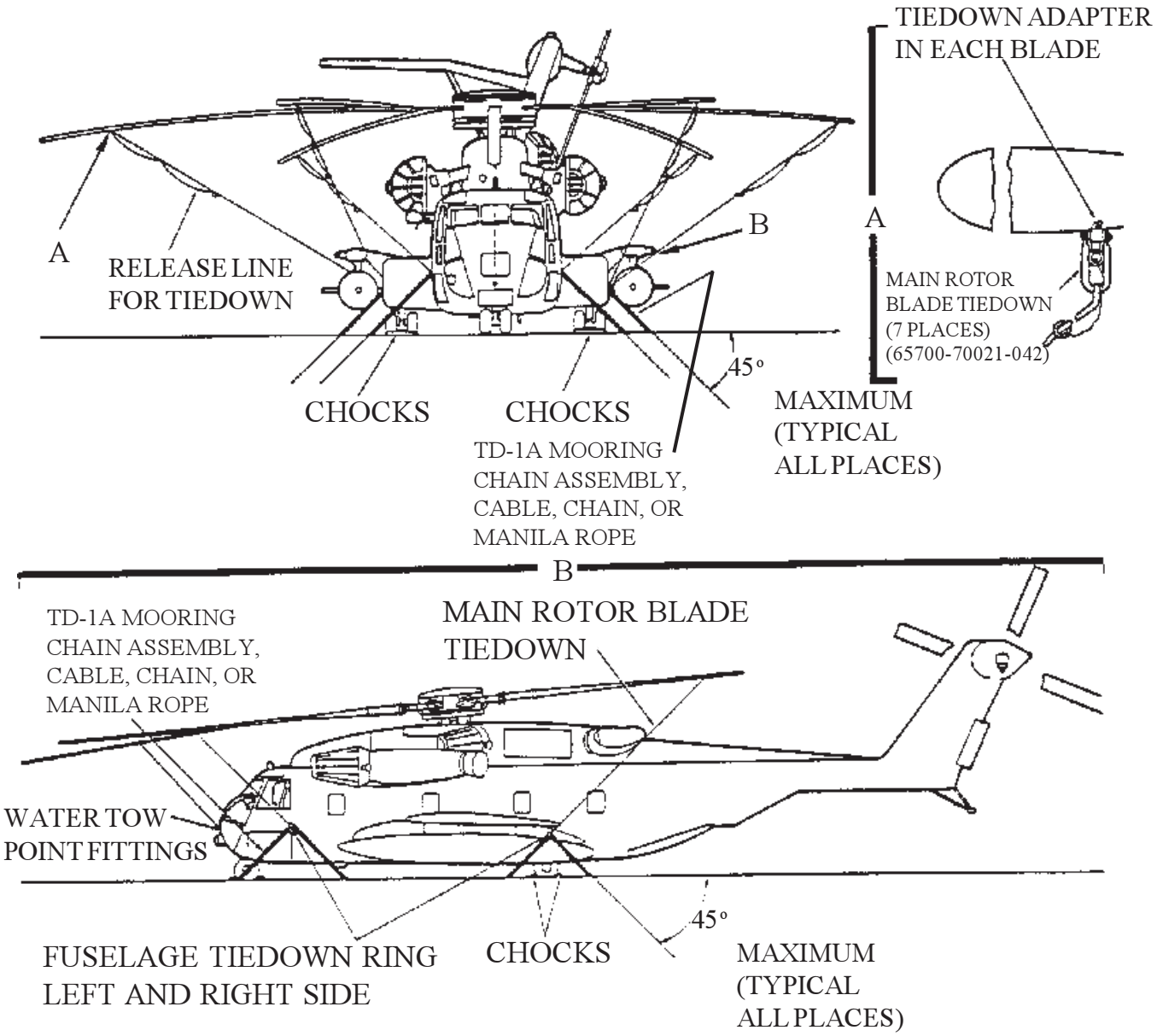
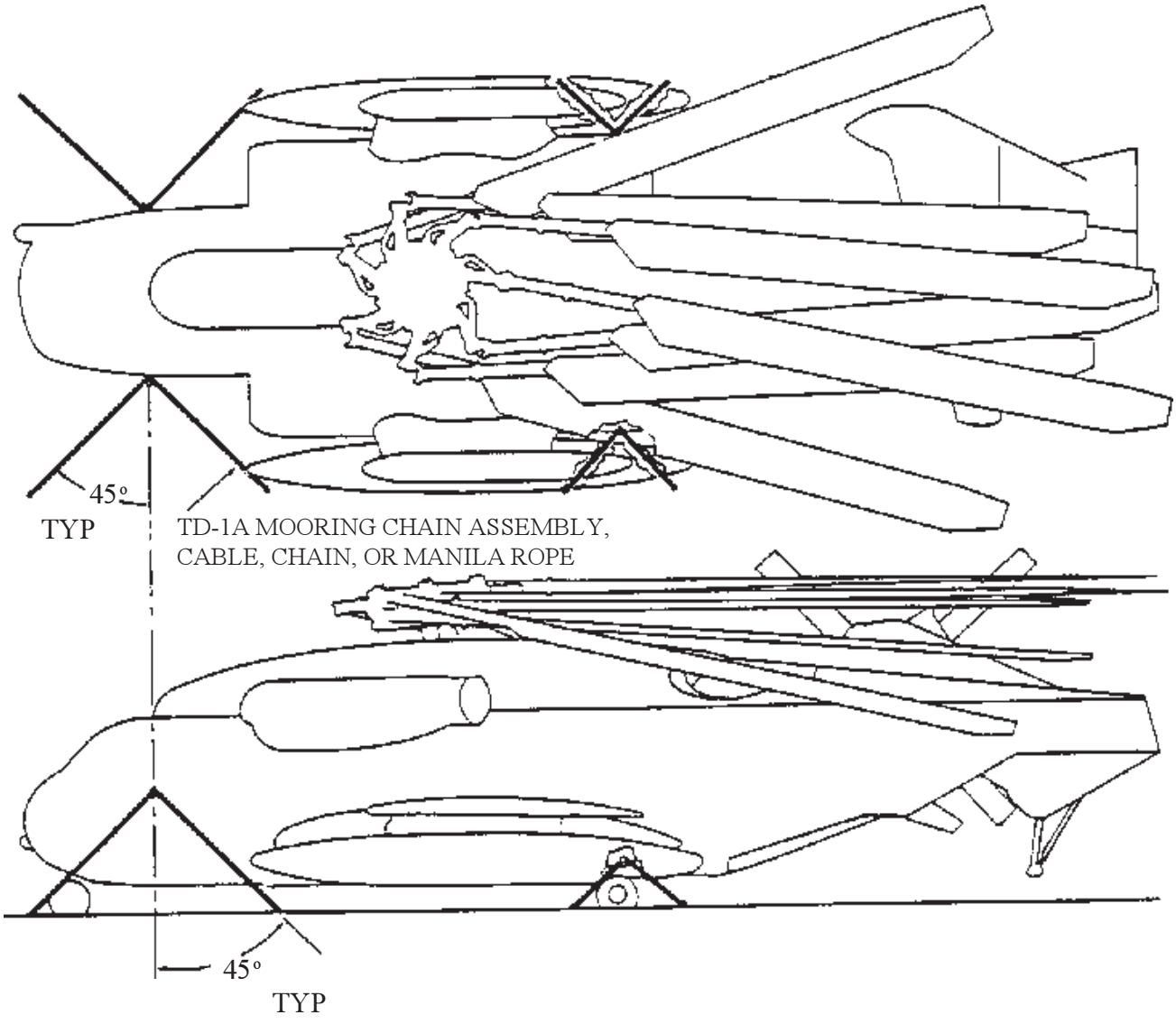
C/MH-53E Super Stallion (Navy) Tiedown Configuration



NOTE
TIEDOWN MOORING CONFIGURATION FOR WINDS BELOW 45 KTS

C/MH-53E Super Stallion (Navy) Tiedown Configuration with Rotor Blades Folded



NOTE
TIEDOWN MOORING CONFIGURATION
FOR WINDS 45-60 KTS

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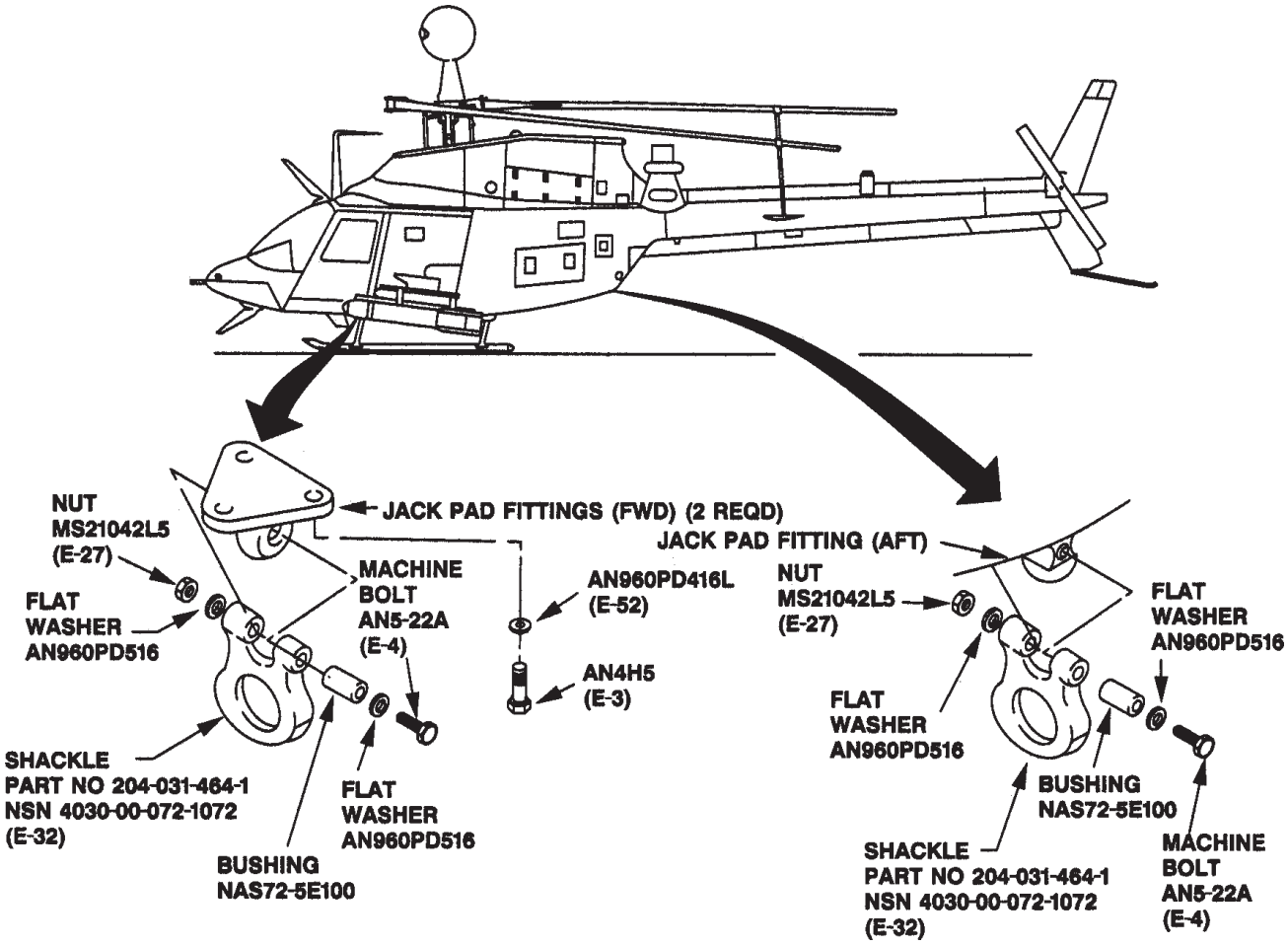
OH-58 Kiowa

OH-58 TIEDOWN RING

OH-58A/C/D Helicopter Jack Pad Fittings



NOTES:

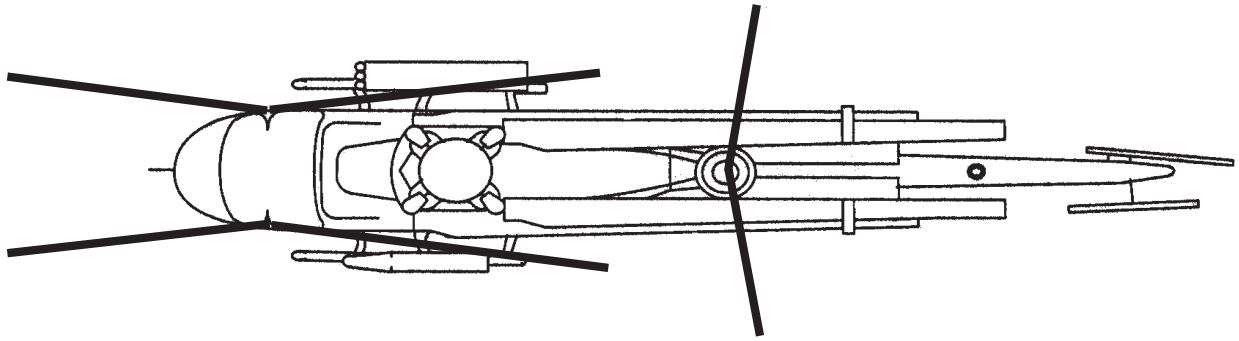
1. THE STRENGTH OF THESE FITTINGS IS EXTREMELY LIMITED, ESPECIALLY WHEN PULLING AWAY FROM THE FUSELAGE. MAXIMUM CABLE TENSION IS 764 AND 1,470 POUNDS ON THE FORWARD AND AFT JACK PAD FITTINGS, RESPECTIVELY.
2. TIGHTEN MB-1 CHAIN ADJUSTERS JUST ENOUGH TO TAKE OUT SLACK.
3. WHEN USING STRAPS, USE ONLY ONE PERSON TO TIGHTEN STRAPS WITH STANDARD (SHORT) RATCHET HANDLES.
4. DO NOT USE STRAPS IN A LOOP CONFIGURATION.

OH-58A/C/D Helicopter Tiedown

Because of the low strength of the jack pad fittings, the OH-58 helicopter requires a total of TEN tiedowns.

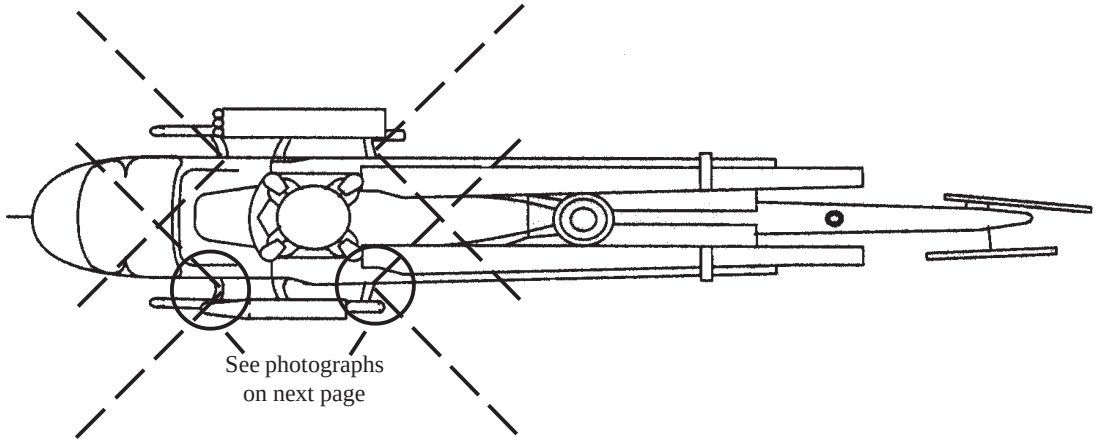
Jack Pad Fitting Tiedowns (6 required)

USE SIX INDIVIDUAL MB-1 CHAINS, CGU-1/B OR POLYESTER STRAPS WITH A BREAKING STRENGTH OF 5,000 OR 6,000 POUNDS. ATTACH EACH CHAIN OR STRAP DIRECTLY TO THE SHACKLE. DO NOT RUN THROUGH THE SHACKLE. ATTACH TIEDOWNS AT THE APPROXIMATE ANGLE SHOWN.



Crosstube Tiedowns (4 required)

USE CGU-1/B OR POLYESTER STRAPS WITH A BREAKING STRENGTH OF 5,000 OR 6,000 POUNDS. WRAP EACH STRAP AROUND CROSSTUBE AS SHOWN IN PHOTOGRAPHS ON NEXT PAGE.



See photographs
on next page

SECURE TIEDOWN STRAPS TO THE CROSSTUBES AT AN ANGLE BETWEEN 30 DEGREES AND 60 DEGREES. 45 DEGREES IS IDEAL.

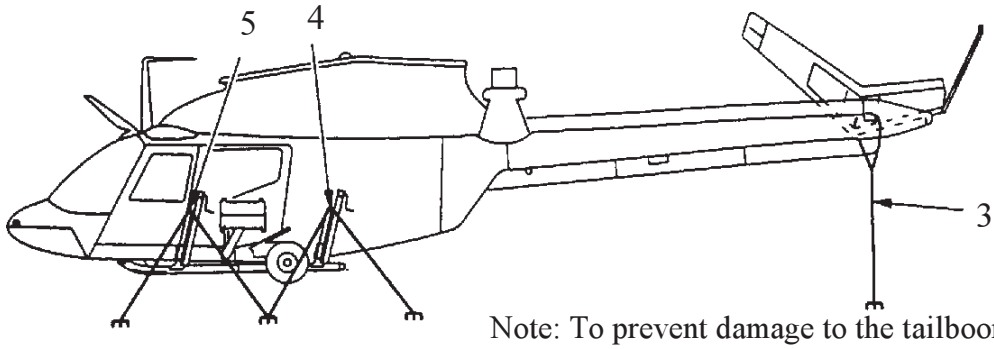
OH-58 CrosstubeTiedowns (standard landing gear)

FOR FRONT CROSSTUBE, WRAP STRAPS (CGU-1/B OR POLYESTER STRAPS WITH A BREAKING STRENGTH OF 5,000 OR 6,000 POUNDS) AROUND CROSSTUBE INSIDE OF WHERE THE FUSELAGE MOUNTS TO THE SKIDS.

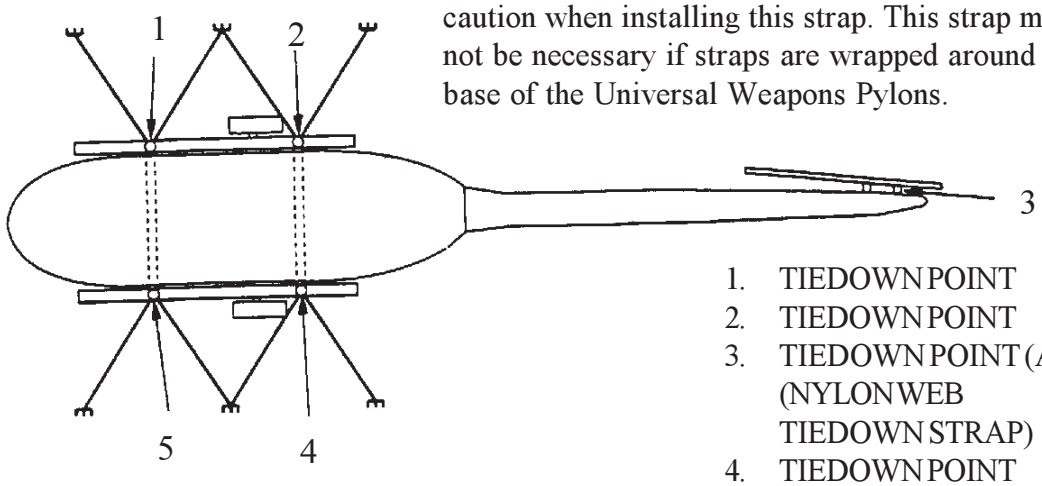
FOR REAR CROSSTUBE, WRAP STRAP (CGU-1/B OR POLYESTER STRAP WITH A BREAKING STRENGTH OF 5,000 OR 6,000 POUNDS) AROUND CROSSTUBE AS CLOSE TO THE OUTBOARD SIDE OR THE FUSELAGE MOUNTS AS POSSIBLE. ATTACH SKID CONNECTING STRAP AS SHOWN.

THESE STRAPS ARE REQUIRED BECAUSE OF THE LOW STRENGTH OF THE JACK PAD FITTINGS.

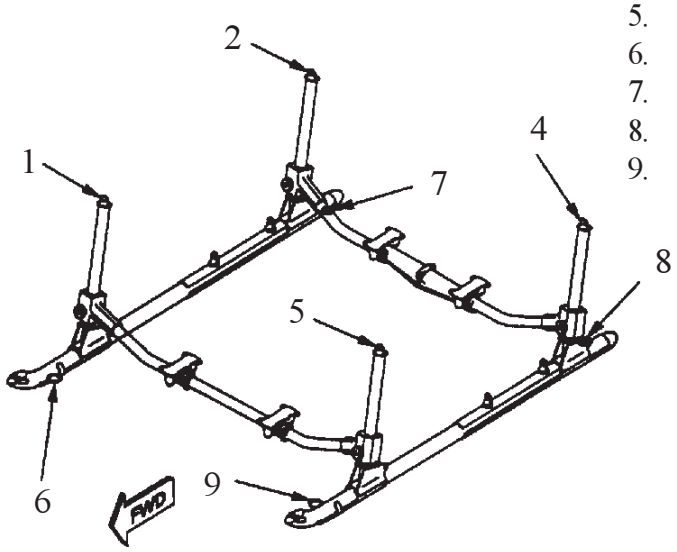
OH-58D equipped with Rapid Deployment Landing Gear



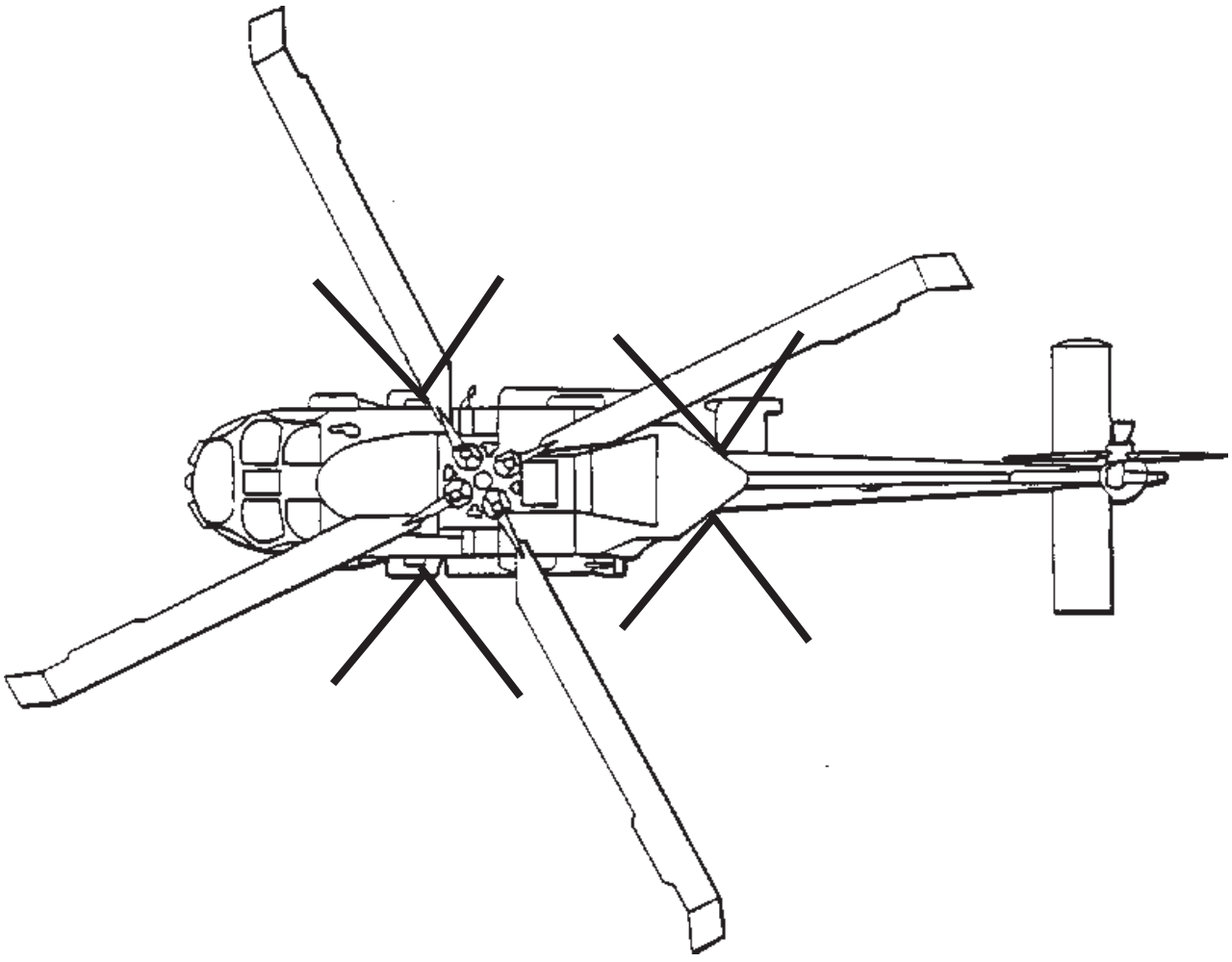
Note: To prevent damage to the tailboom, use caution when installing this strap. This strap may not be necessary if straps are wrapped around the base of the Universal Weapons Pylons.



1. TIEDOWN POINT
2. TIEDOWN POINT
3. TIEDOWN POINT (AFT) (NYLON WEB TIEDOWN STRAP)
4. TIEDOWN POINT
5. TIEDOWN POINT
6. TOWING POINT
7. TOWING POINT
8. TOWING POINT
9. TOWING POINT



HH-60J/SH-60B Seahawk (Navy) Tiedown Configuration



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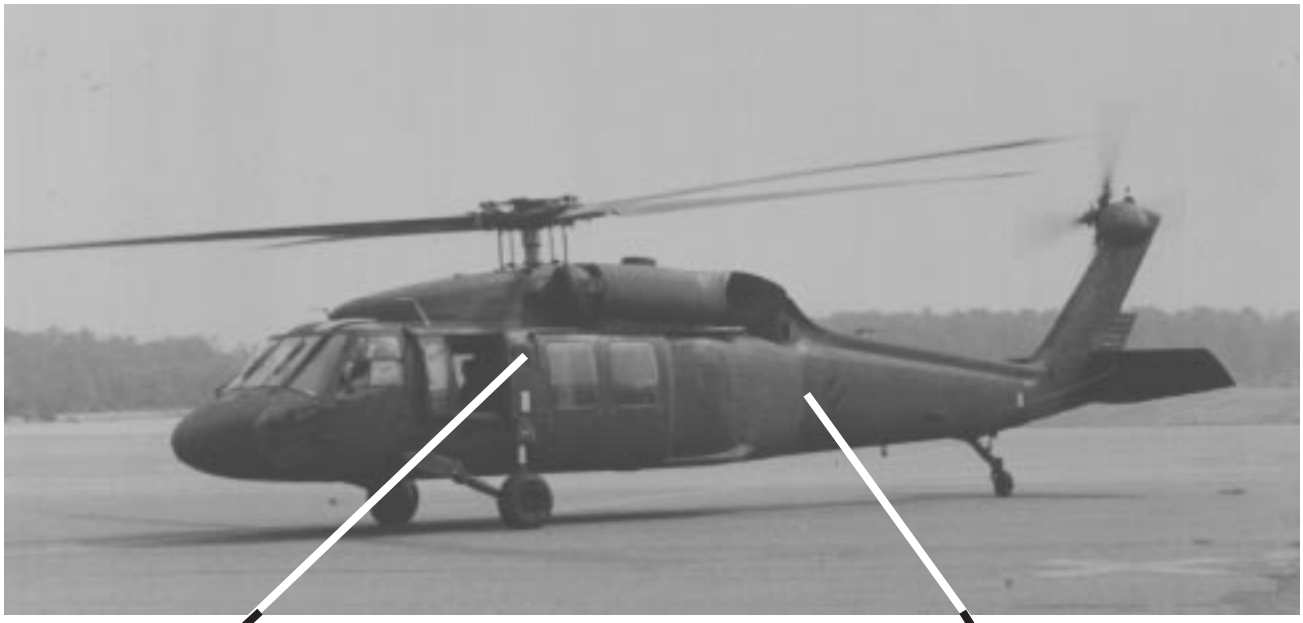
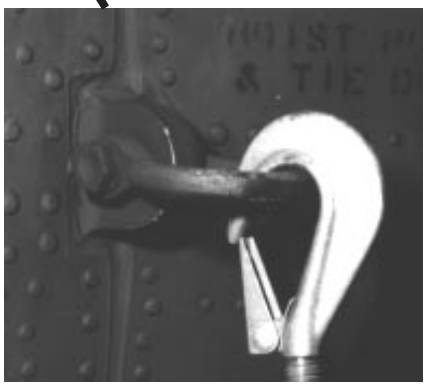
UH-60 Black Hawk

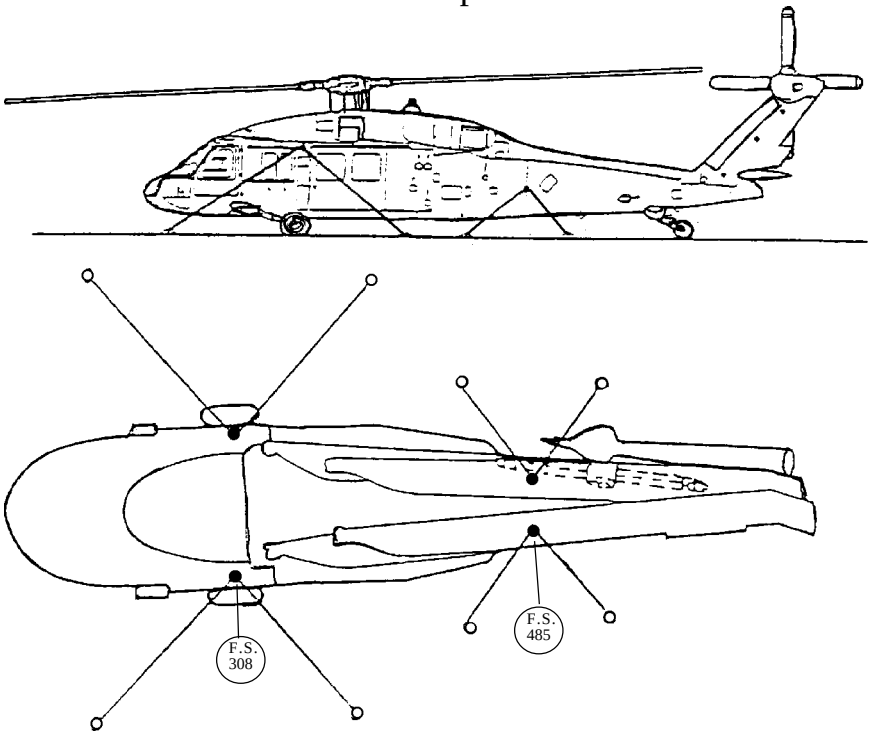


UH-60 FORWARD
TIEDOWN FITTING



UH-60 AFT LIFTING/
TIEDOWN FITTING

UH-60 Helicopter Tiedown



NOTES:

1. SECURE ALL TIEDOWN DEVICES AT AN ANGLE BETWEEN 30° AND 60°. 45° IS THE IDEAL.

2. USE ONLY MB-1 CHAINS OR POLYESTER STRAPS WITH A BREAKING STRENGTH OF AT LEAST 15,000 POUNDS (FOR U.S. STRAPS, THE BREAKING STRENGTH IS 3 TIMES THE WORKING LOAD LIMIT).

3. USE INDIVIDUAL CHAINS OR STRAPS FOR EACH LINE (8 REQD). DO NOT RUN THE TIEDOWNS THROUGH THE AIRCRAFT SHACKLES.

4. APPLY ONLY ENOUGH TENSION TO REMOVE FREE PLAY FROM THE TIEDOWN DEVICES.

5. REMOVE STABILATOR AND FOLD TAIL PYLON ONLY IF NECESSARY FOR ADEQUATE HELICOPTER SPACING.

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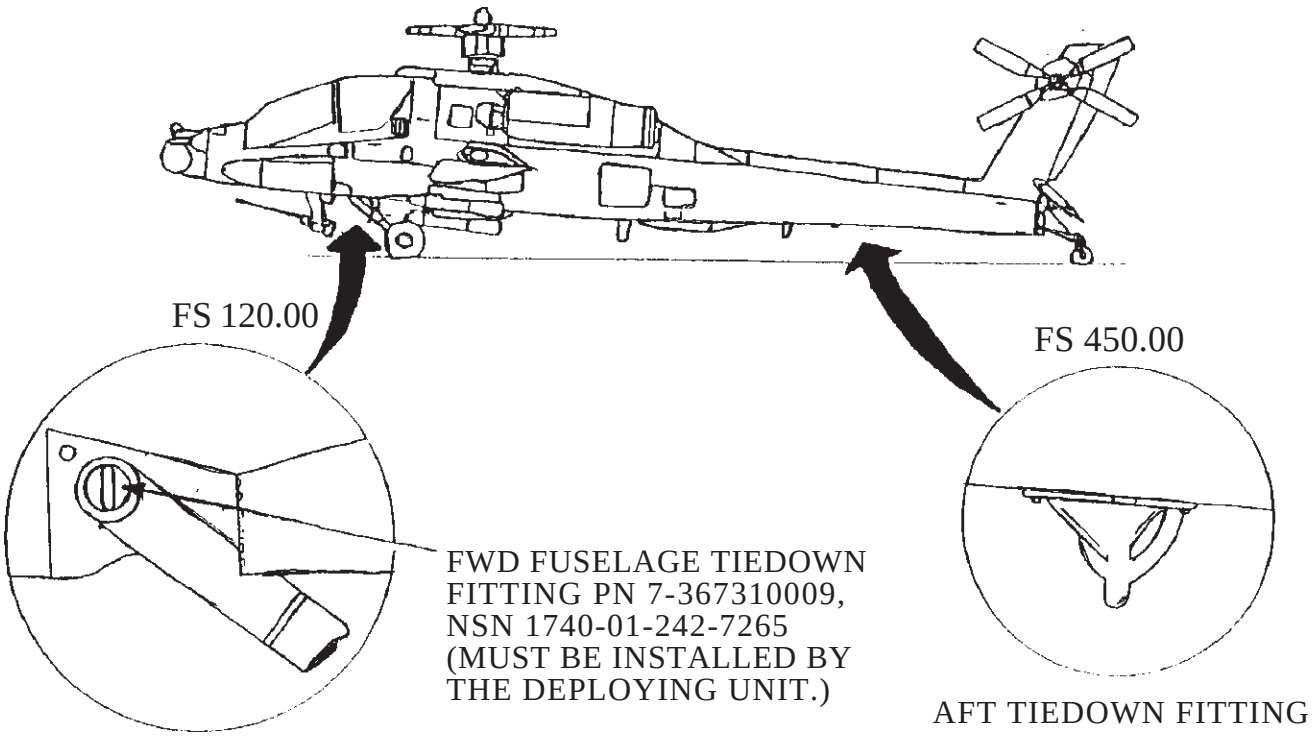
AH-64 Apache

AH-64 MAIN
LANDING GEAR
TIEDOWN FITTING

AH-64 TAILBOOM
TIEDOWN FITTING

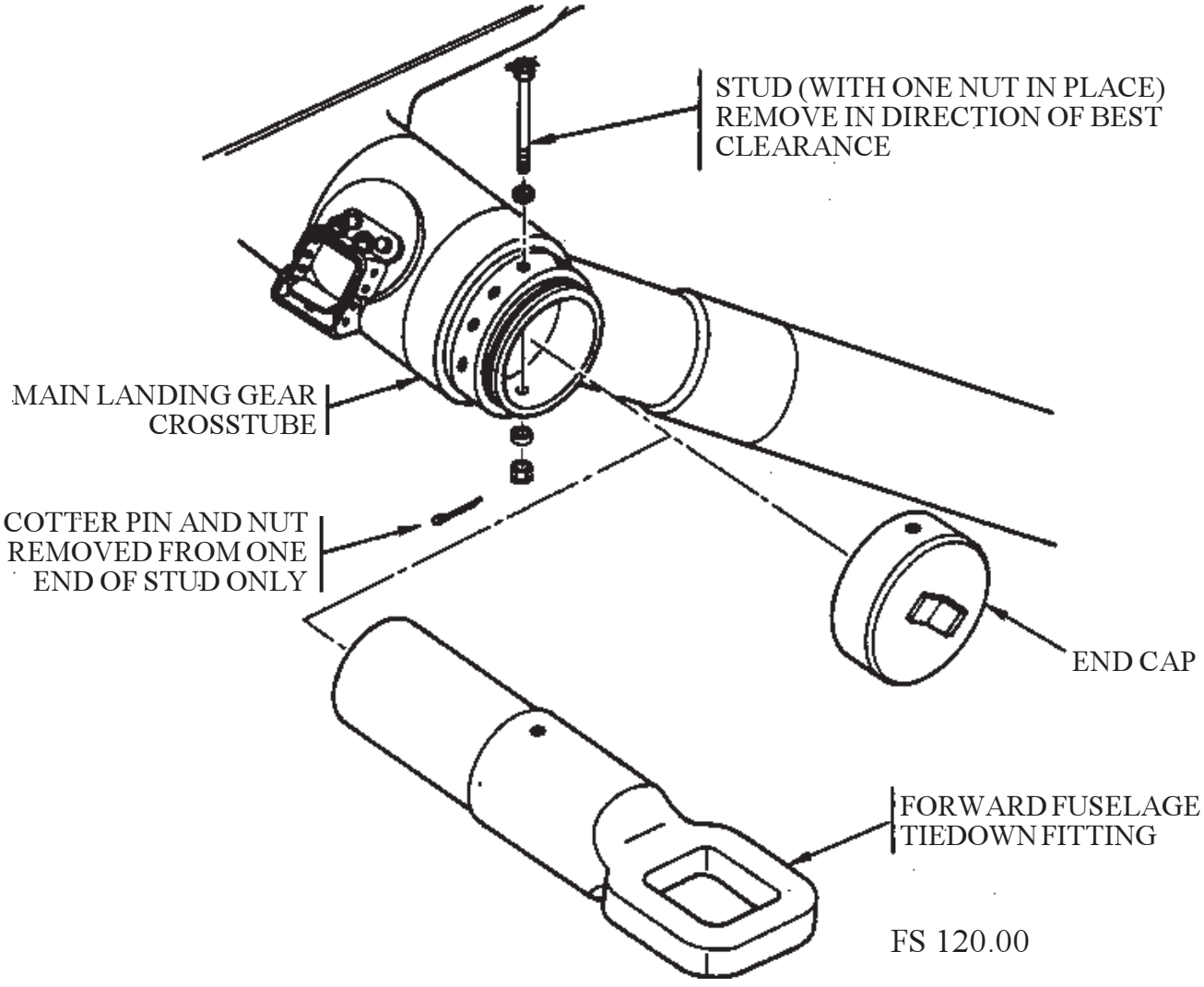
AH-64 HELICOPTER
FORWARD FUSELAGE
TIEDOWN FITTING

AH-64 Helicopter



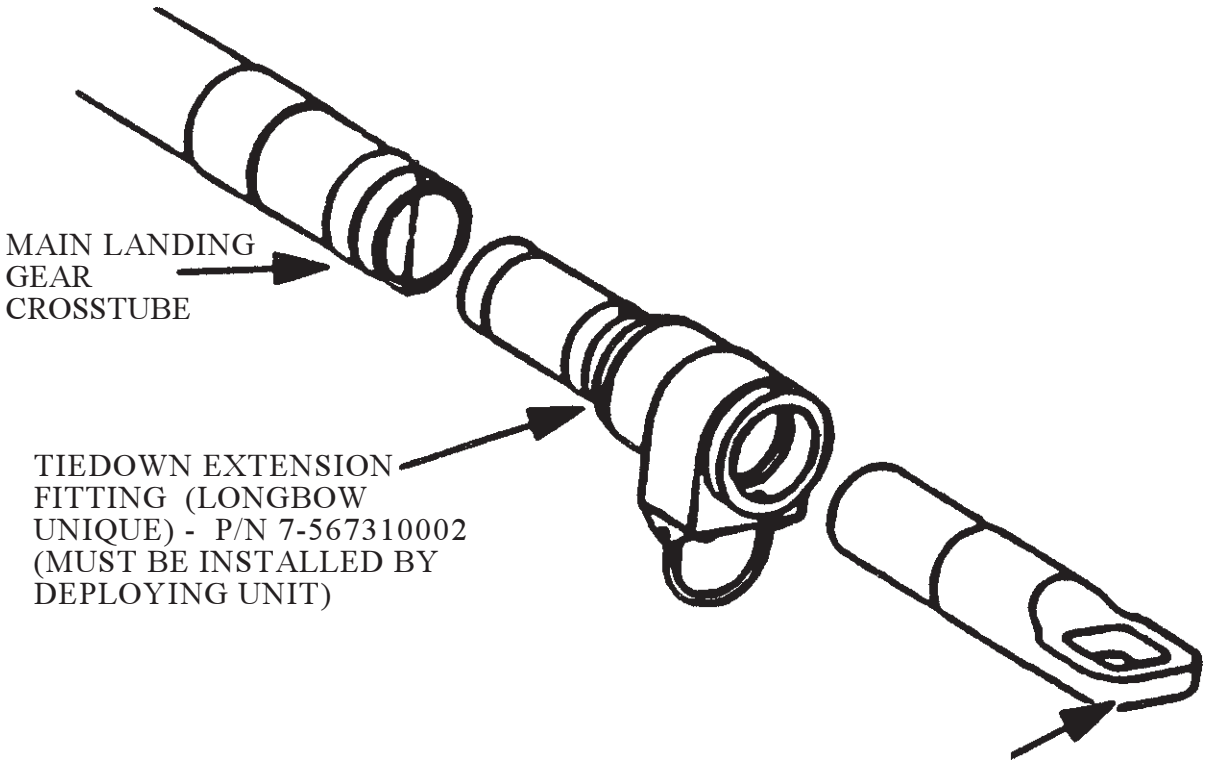
AH-64A Helicopter Forward Fuselage Tiedown Fitting

DETAIL A



NOTE: LEFT SIDE SHOWN, TYPICAL FOR BOTH SIDES

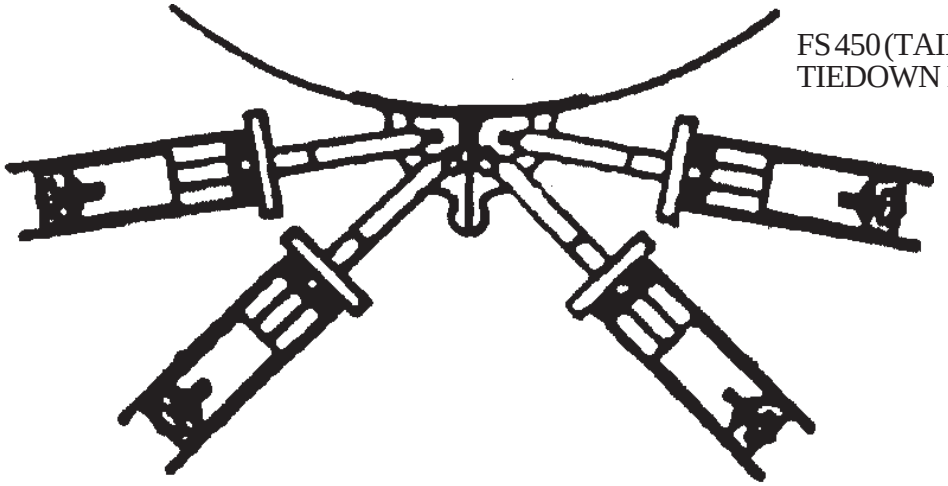
AH-64D Longbow Apache Forward Fuselage Tiedown Extensions and Tiedown Fittings



NOTE: LEFT SIDE SHOWN, TYPICAL FOR BOTH SIDES

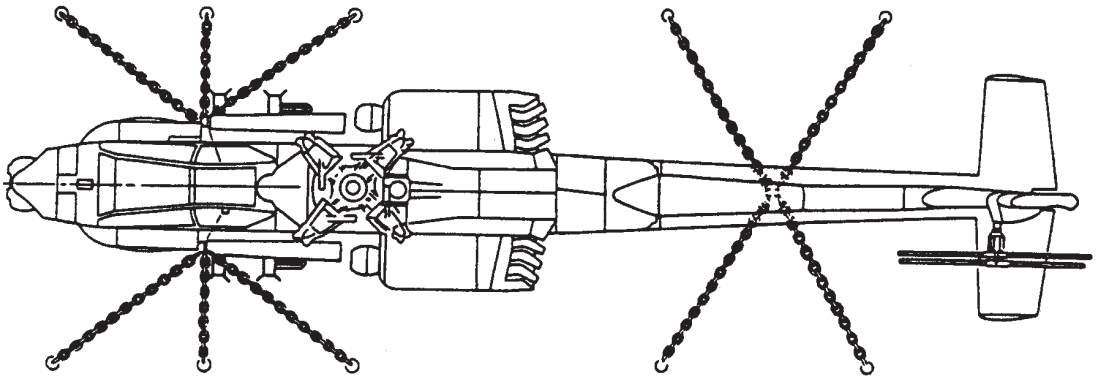
AH-64 Helicopter
Aft Fuselage Tiedown Fitting

DETAIL B



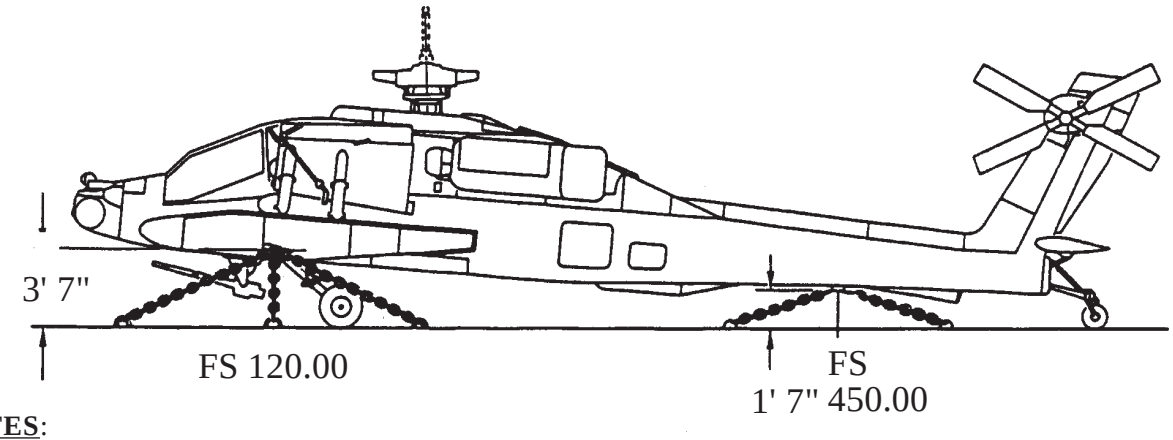
NOTE: ATTACH FOUR MB-1 CHAINS OR POLYESTER STRAPS WITH A BREAKING STRENGTH OF AT LEAST 10,000 POUNDS DIRECTLY TO THE AFT TIEDOWN PROVISION. DO NOT RUN CHAINS THROUGH THE PROVISION.

AH-64 Helicopter Tiedown Diagram for Vessel Below Deck Transport



SIX 10K CHAINS OR STRAPS REQUIRED FOR FRONT TIEDOWN

FOUR 10K CHAINS OR STRAPS REQUIRED FOR REAR TIEDOWN



NOTES:

1. SECURE ALL TIEDOWN DEVICES AT AN ANGLE BETWEEN 30° AND 60°. 45° IS THE IDEAL.
2. USE ONLY MB-1 CHAINS OR POLYESTER STRAPS WITH A BREAKING STRENGTH OF AT LEAST 10,000 POUNDS (FOR U.S. STRAPS, THE MINIMUM BREAKING STRENGTH IS 3 TIMES THE WORKING LOAD LIMIT).
3. USE INDIVIDUAL CHAINS OR STRAPS FOR EACH LINE (10 REQD). DO NOT RUN THE TIEDOWNS THROUGH THE AIRCRAFT SHACKLES.
4. APPLY ONLY ENOUGH TENSION TO REMOVE FREE PLAY FROM THE TIEDOWN DEVICES.

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B TM 55-1520-242-S, *Preparation for Shipment of UH-1/EH-1 Helicopters*.

C TM 55-1520-241-S, *Preparation for Shipment of CH-47 Helicopters*.

D TM 55-1500-338-S, *Preparation for Shipment of OH-58A/C Helicopters*.

E TM 1-1520-248-S, *Preparation for Shipment of OH-58D Helicopters*.

F TM 1-1520-237-S, *Preparation for Shipment of UH-60 Helicopters*.

G TM 55-1520-238-S, *Preparation for Shipment of AH-64 Helicopters*.

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I NAVAIR 00-80R-20, *NATOPS U.S. Navy Aircraft Crash and Salvage Operations Manual (Ashore)*

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